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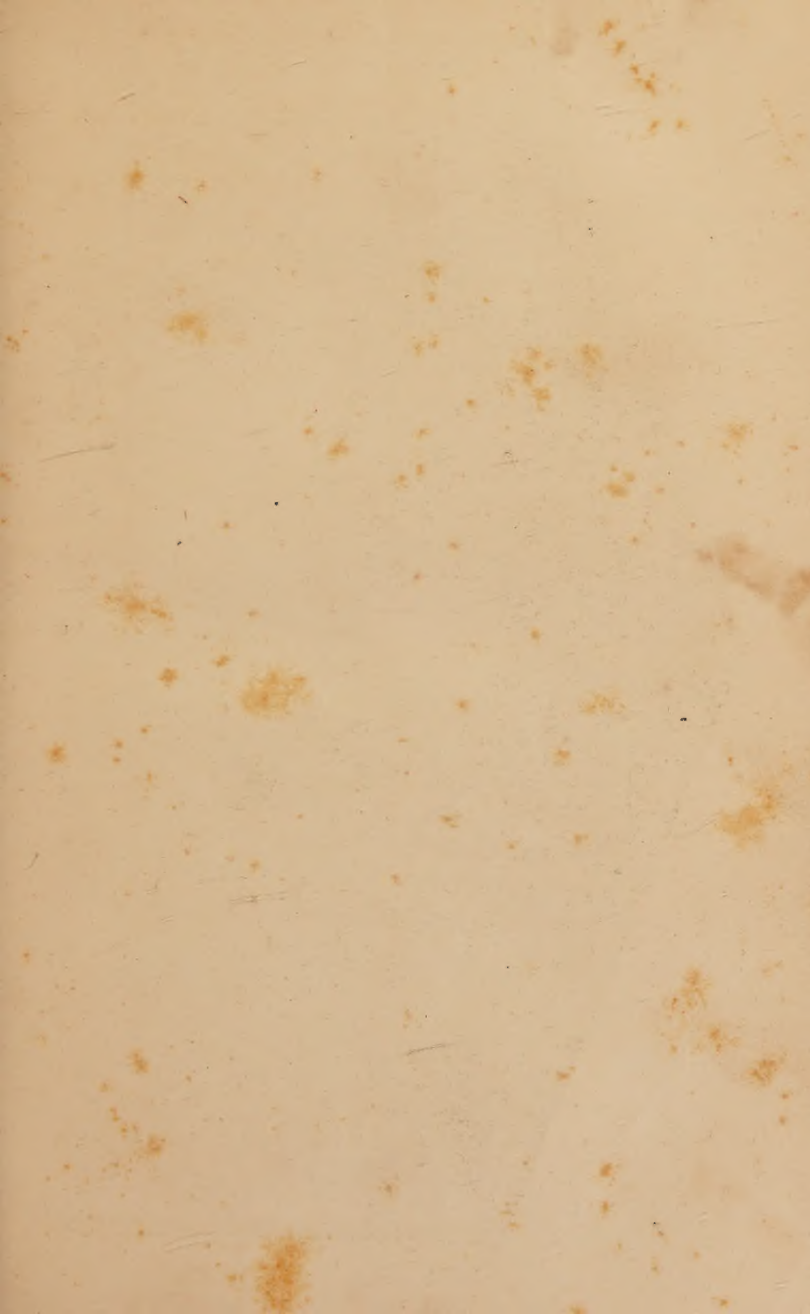
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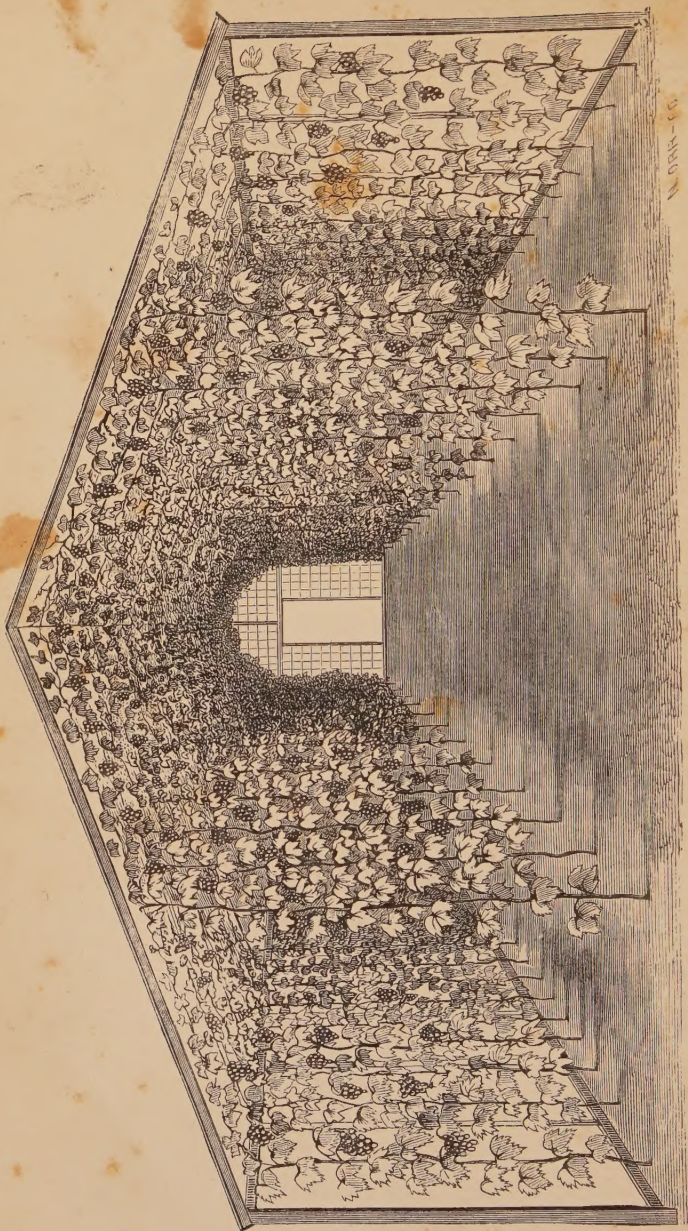














A  
PRACTICAL TREATISE  
ON THE  
CULTURE AND TREATMENT  
OF THE  
GRAPE VINE:

EMBRACING

ITS HISTORY, WITH DIRECTIONS FOR ITS TREATMENT, IN THE UNITED  
STATES OF AMERICA, IN THE OPEN AIR, AND UNDER GLASS  
STRUCTURES, WITH AND WITHOUT ARTIFICIAL HEAT

BY J. FISK ALLEN.

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THIRD EDITION—ENLARGED AND REVISED

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## Introduction to the Third Edition.

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THE first edition of this treatise was prepared at the suggestion of some friends and other gentlemen ; it was intended for use more particularly in Massachusetts and the neighboring States. It has had a more extensive circulation, and, from questions proposed to me from distant States in this Union, as also by direct request, I have been induced to prepare a second, and again a third edition, enlarged by notes of my own, explanatory of the first, and by copious extracts from such sources as would present most, if not all, of the various conflicting views respecting the cultivation of the grape.

In giving the opinions of others, it has been my endeavor to embrace as great a period of time as possible, that the difference in those now held, if any, might be seen ; to attain this object, when by so doing, I could retain the ideas of those quoted, such parts have been extracted as contained selections from previous authors. In the remarks on these opinions and systems, their bearing upon the culture, in this country, has been mainly considered.

and they have been made with the object of conveying information, and not with the idea of criticising them. Circumstances of climate, or location, may render a practice successful in one country, that may be highly improper in one differently situated.

In the first edition, it was the plan to give a concise account of my own practice, as a system to be followed by others, without giving the reasons therefor. It was well known, in the vicinity of the city where my residence was, and where it was presumed this treatise would circulate chiefly, that, for several years, I had been experimenting upon the different plans recommended, (and which had caused me so much perplexity in the selecting of the most suitable for this climate,) in order that I could fix upon one worthy of general adoption. To spare other cultivators this perplexity, very little was said of soils and manures ; a compost was recommended as suitable, and a substitute named, in case the materials in the former could not readily be obtained. Of the systems of training and pruning, all that could be of use was given, and the advantages and disadvantages appertaining to each were noticed.

In the present edition, it has been my plan to give all shades of opinion, for every variety of climate ; that, wherever located, some remarks might be found appropriate to the situation, provided it is within the latitude suited to grape culture. My own opinions are fully expressed, and, as the views of others have been added,



also, and wherein we differ freely stated, the reader can select for his own adoption, that system which recommends itself as the best to his mind.

This treatise is not offered to the public as containing anything new, but simply as recommending a plan which has operated well with the author; it is intended as a guide to the person entirely unacquainted with the grape culture, and for the benefit more especially of those living remote from cities, in newly settled places. This will explain, why matters, which appear to the experienced of small account, have been so particularly noticed; it has given occasion to some repetition also, but I thought it best to err on this side, than that there should be any want of plain explanation of my meaning. Rules have been given for the propagation of the vine, the planting out, pruning, training, and other routine duties.

Views of grape-houses, with minute descriptions of the manner of building and warming them, and every little matter which could be supposed to occur to one unaccustomed to the subject, have been added.

The subject of soils and manures has received the largest share of attention; pruning and training, when compared with the above, are secondary affairs, as the vine, if well located, in suitable compost, will do well under any system judiciously practiced. In treating these matters, I have endeavored to keep distinct the subjects of compost for the border of the grape-house, and the soil suitable for the vineyard. I have not always

succeeded in doing so, nor is it a matter of much consequence, for what is suitable in the one case, can hardly be injurious in the other; it is not to be presumed, however, that the same labor and care will be bestowed on the preparation of the soil for the vineyard, that one would give to the border for the grapery.

The material of the former edition, which is simply the details of my practice, is, in this, unchanged; when necessary, rather than alter the original, notes explanatory have been added.

I will state here, as an explanation for any repetition, or for the want of more system in the arrangement of the matter, that the work has been performed little by little, as I could spare an hour from other labors; and, the present edition being an enlargement of the former, the matter now added is introduced where it could best be under these circumstances.

SALEM, Mass., January, 1853.

## Introduction to the First Edition.

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THERE are several works published in England, written by practical men, giving ample directions for the cultivation of the grape in that country; but the climate of the Northern States of America is so different from that of England, that, however well calculated these directions may be for the latter, they can hardly be expected to suit the former. The temperature of England is milder, and is not subject to the great extremes of heat and cold which we experience. The searching northwesterly winds, which prevail with us in New England in the winter and early spring months, with the mercury often at zero, and even below that point, and the sudden changes we are liable to, in this season of the year, often equal to forty degrees in a few hours, render the care requisite, for the successful forced culture of fruit, very great, and the process a more difficult one, *in this country*, than in England.\*

\* Mr. Hovey, in his Magazine of Horticulture, quotes the above passage, with this remark relative thereto: "In regard to the 'more difficult' pro-

Do not build a grapery under the erroneous impression, that, having done so, and planted the vines, you have secured to yourself, without further labor, a boun-

cess of producing the grape, *in this country*, the author undoubtedly alludes to early forcing; for we apprehend that, in cold houses, the process requires as little care, if not much less, than in England." I cannot imagine how any one could doubt the meaning of this expression; for, after mentioning the extreme changes in winter and spring, the mercury falling to zero, (*which it can never be expected to do when the grapes are growing in a cold house*), is added these words: "render the care requisite, for the successful FORCED culture of fruit, very great, and the process a more difficult one," &c. If Mr. Hovey considers growing grapes under glass, without fire heat, forcing them, he differs from me, in what forcing is. (See Remarks on Forcing.)

The care necessary, is in the regulation of the temperature of the *Forcing House* in the daytime, under the particular circumstances referred to. Good judgment, some experience, and much caution, are requisite in the proper ventilation of the house at these times. For instance, the mercury, in the open air, has been, during the night,  $5^{\circ}$  or  $10^{\circ}$  below zero; to keep the temperature of the house at  $45^{\circ}$  or  $50^{\circ}$ , at sunrise, you must have the flues, or water-pipes, hot; as soon as the sun shines, as it frequently does in winter as well as in the summer, with great brilliancy upon the glass, the heat rapidly accumulates, and the mercury is soon at  $90^{\circ}$  or  $100^{\circ}$ . The temperature in the open air may be at zero, or from that point up to  $20^{\circ}$ . Now, here is the difficulty; if the top lights, or any other ventilators are opened so as to allow a current of this cold air to flow over the vines, the fruit thus exposed will perish, and if you suffer this very high temperature, when  $80^{\circ}$  or  $85^{\circ}$  is the highest point you should allow, the vines will be unduly excited, and consequently very liable to a check, when the temperature falls. The foliage may not show, at the time, any bad effects from this cold air, but soon the young bunches will turn yellow and drop. "What is the matter with my vines?" (is a question which is often put to me,) "they pushed very strong, and showed fine bunches of fruit, but the most of them have dried up and dropped." They have at some time received a check to the flow of the sap, and the effect of this, in the first seventy days of forcing, will always be the loss of the crop. Having small ventilators, and opening the lights but very little, with every precaution that can be used, under the circumstances, to remedy and prevent the too much heat, and the admission of a current of the cold air, is the only way to avoid any ill effects from such causes.



tiful supply of fruit; if you do so, you must be sadly disappointed.

Probably there is no plant so sure of yielding an annual crop as the grape, under right management; but this is absolutely necessary, to insure success.

The attempt has been made to give plain rules, which may be easily understood, and the practical operation of which can be carried out with as little labor as the proper cultivation of the grape, under glass, will permit.

The following directions are intended for those who may desire to cultivate this fruit, for their own pleasure or convenience, and do not wish to incur the expense of a regularly educated gardener, and who have felt the want of a concise and simple explanation of the process, and the rules by which these operations of forcing and of growing grapes, under glass structures, can be carried out.

The treatment recommended is such as has been found

Mr. A. Forsyth, in a diary of the culture of the grape in a forcing-house, at East Barnet, in Herts, published in Loudon's Magazine, page 548, vol. 10th, makes these remarks relative to the weather: "December the 15th, weather favorable; the nights often  $50^{\circ}$  or  $52^{\circ}$ ; seldom under  $40^{\circ}$ . We have had only four frosts; the most intense, as low as  $26^{\circ}$ ." A diary of the forcing-house kept by myself, on the fifteen first days of December, has five or six days when the cold is said to be very severe, below zero or about it; and several days, when it was mild by day, the mercury fell to  $16^{\circ}$  and  $18^{\circ}$  at night. In any degree of cold at night, if the heating arrangements are suitable, the temperature, with proper care, can be easily regulated. That there is a vast difference in the attention required when the mercury ranges from  $20^{\circ}$  to  $48^{\circ}$  above zero, or when it is as low as  $6^{\circ}$  or  $10^{\circ}$  below, any one having had experience in such matters will readily admit.

to be the best after many years' experience, in its cultivation; during which time, the different systems of pruning have been all tried, and many of the vineyards in France, and on the Rhine, in Italy, and other countries have been visited, and the manner of pruning, the varieties of soil, and the amount of fruit which a vine is permitted to ripen, have been examined and ascertained.

The disadvantages we labor under, in this country, in forcing fruit, from the extreme coldness of the weather in winter, are counterbalanced, in some degree, by the superior brilliancy of the sun, and consequent dryness of the atmosphere, at the time of ripening, which give a flavor to the fruit, such as it can rarely be made to attain in the moist, dull, and cloudy weather of England.\* The variations of the temperature are always indicated by a Fahrenheit thermometer.

\* I find that I have not always been here rightly understood. The idea intended to be expressed is, that the natural advantages of our climate over that of England, in respect to the atmosphere, are very much in our favor. Most seasons, the grapes produced in this country in houses without fire heat, are equally well flavored as those grown with artificial heat. The forced fruits of England, grapes, pine apples, and cherries, are very superior. I have never, in any country, eaten better, particularly the pine apples, which are richer in flavor than any I have ever tasted in the East Indies.

## History of the Grape Vine.

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THE vine is known to have existed from the earliest time of which we have record. Extracts from different sources, giving its history and the time and manner of its introduction into Europe, are annexed.

The variety of the grape from which have originated all the kinds cultivated as European sorts in this country, came first from Asia. For many centuries it has been cultivated in the warm and temperate latitudes of Europe.

The vine is also indigenous to America; it is found, in its wild state, over a very large extent of country in great variety, and growing to the tops of the highest trees, in the season of inflorescence filling the air with its perfume.

In America, we cultivate, generally, two species of the grape, the *Vitis vinefera*, which is the type of what we call the European varieties; and the *Vitis labrusca*, —of this species are the *Isabella* and *Catawba*, native sorts.

The grape has been cultivated in all ages, and held in

high estimation. The generally-received opinion of the manner of its introduction into Europe is, that it made gradual approaches by the way of the Mediterranean Sea, the Phœnicians first carrying it into the islands there, from whence it spread into Italy, Spain, France, and Portugal, and thence north through France, Switzerland, England, &c., &c.; from all these countries we have received, in the United States, our varieties of this species. It lives to a great age, and forms wood capable of being serviceable in the arts. The cultivation of the grape, in its northern extent, is not confined to a certain parallel of latitude. It has been observed in Europe, that, as you go east, the cultivation of this plant extends to the north. Arthur Young says, that, in France, the difference is  $2^{\circ}$  of heat in the same parallel. In the United States of America, the difference of climate is also found, but operating in a reversed manner. In the same latitude, as we go west, is found a milder climate, particularly after passing the Alleghanies, and, on the Pacific, it is yet more mild. At Fort Vancouver, which is five degrees north of New York, the temperature is so mild that, in winter, the mercury falls but a few times below freezing.

“GRAPE VINE. *Vitis*.

“The generic name is derived from *vincire*, to bind. Every part of the Scriptures mentions the vine as being held in the highest estimation. Noah planted vineyards and made wine. They are mentioned among the bless-



ings of the promised land, 'a land of wheat, and barley, and vines,' etc.

"At what exact period the vine was first cultivated in England, is uncertain; but we conclude it was as early as about the tenth year, A. D., as, at that time, the Romans had possession of a great part of this island, and had introduced the luxuries of Italy wherever they settled. Many authors are of opinion that it was not introduced into this country until about the year 280.

"That we are indebted to the Romans for the first introduction of the vine is generally allowed, although it is possible it might have been introduced at a much earlier period than we have stated, as the Phoenicians are said to have planted the vine in the isles of the Mediterranean Sea, as well as in several parts of Europe and Africa; and as we have accounts of their trading to Britain, for tin, they might have planted it on the English coast also. But this must remain a matter of conjecture any farther than as it confirms the vine to have been originally brought from Palestine. In the Book of Numbers we find that the men whom Moses had sent to spy the land of Canaan, returned with a bunch of grapes which they bare between two, upon a staff.

"The Damascus grapes, at the present time, are often found to weigh upwards of twenty-five pounds the bunch. In the accounts from Ægidus Van Egmont, envoy from the States to the King of Naples, and John Heyman, professor of the oriental languages in the uni-

versity of Leyden, who have published their observations on the present state of Asia Minor, it is mentioned that, in the town called Sedonijah, which is four hours journey from Damascus, some of the grapes were as large as pigeons' eggs, and of a very exquisite taste. From these circumstances, we may fairly conclude that the vine is a native of Syria.

“Although wine is not made in Egypt, vines are much cultivated, and the grapes have a delicious perfume.

“Pliny concludes that the vine was very rare in Italy in the time of Numa, and, to encourage the pruning of vines, he prohibited the use of any wines, in sacrifices to the gods, that were cut from vines which had not been pruned.

“It was not until about the year 270, that the vine was planted in the northern parts of Gaul, and about the rivers Rhine, Maine, and Moselle, and in Hungary.

“The various wines made from the grape are very numerous. Pliny says, in his day there were eighty kinds of the best.

“The island of Madeira was planted with the vine, from cuttings brought from Cyprus, in the year 1420, when the island was first discovered. The Rhenish vine has also been planted there.

“The Cape of Good Hope has been planted with vines from the Rhine, Persia, and other countries.

“The juice of the ripe grape (says Dr. Darwin) is a

nutritive and agreeable food, consisting chiefly of sugar and mucilage. The chemical process of fermentation converts the sugar into spirit; converts food into poison.

“It has been observed, that all the vineyards in Germany, beyond the 51st degree of latitude, are dubious.”—*Phillips's Companion to the Orchard*. London, new ed. 1831.

“Pliny states that the vines in Italy would climb to the very top and even out-top the highest poplars; on which account the grape-gatherers, in time of vintage, put a clause in the covenant of their bargains when they were hired, that, in case their foot should slip and their necks be broken, their masters should give orders for their funeral fire and tomb at their own expense.

“Ancient naturalists and modern travelers agree in their accounts of the long life and immense size to which the vine attains in its wild state. Statues have been carved from its wood, pillars have been made from it, and the large doors of the cathedral of Ravenna are also made from this wood. Large tables have been made of a single plank. Pliny gives an account of a vine six hundred years old.”—*Chaptal*, p. 142.

“Miller says, of the vines in Italy, that, in some parts of that country, a vine is considered young at one hundred years, and that there are plants in existence which have been cultivated three hundred years.”—*Chaptal*.

“The Burgundy wine has been celebrated for its superior quality certainly as far back as the 13th century.

The kings of France have interested themselves in the planting of vines in their domains. There is proof that Charlemagne had attached to the palaces which he inhabited, vineyards, and the necessary instruments for making wine; and there you might behold the sovereign enter upon the details of the management with the overseer.

“The garden of the Louvre, as of the other royal houses, has contained vines since the year 1160. Louis the young allowed annually, from their produce, six hogsheads of wine to the rector of St. Nicholas.

“Philippe Augustus, as shown by the account of the revenues for the year 1200, reported by Bussel, possessed vineyards in Bourges, Soisons, Compeigne, Laon, Beauvais, Auxerne, Corbeil, Betise, Orleans, Moret, Poissi, Gien, Anet, Charlevane, Verberries, Fontainbleau, Rurecour, Mili, and several other parts of France.”—*Chaptal*.

“The vine was introduced by the Phœnicians into cultivation in Europe by the way of the Mediterranean islands, Italy, and Marseilles.”—*Chaptal*.

“From the remotest records of antiquity, the vine has been celebrated as the type of plenty and the symbol of happiness. The pages of Scripture abound with allusions to the fertility of the vine, as emblematical of prosperity; and it is declared, in describing the peaceful and flourishing state of the kingdom of Israel, during the reign of Solomon, that ‘Judah and Israel dwelt safely, every man under his vine and under his fig-tree.’

It is supposed to have been introduced into Britain at the commencement of the Christian era, and history amply proves that, for a long series of ages, vineyards were very common in the southern parts of the island, and that the quantity of wine produced from them was so great as to be considered one of the staple products of the land."—*Clement Hoare. London, 1837.*

Konisburgh, in north latitude, nearly  $55^{\circ}$ , is considered the limit at which the grape will ripen in Europe.

Humboldt has observed, that the best wines are produced from vineyards situated in the interior, away from the sea-board, and remarks, that the cause does not alone reside in the lower summer temperature of the coasts, but attributes the difference to the light, from a clearer state of the heavens. He also says, "to have palatable wine, not only must the mean annual temperature exceed  $49^{\circ} 55'$ , but that the mean winter cold must not fall quite to the freezing point,  $33^{\circ} 4'$ , and this must be followed by a mean summer heat of at least  $64^{\circ} 4'$ ."





# The Culture of the Grape.

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## SITUATION OF THE GRAPERY.

FIRST in order, and of the utmost importance, is the situation of the house. It must be so located, that stagnant water will not remain on the border, or within reach of the roots of the vine.

If you cannot avoid building the house where water is found to stand two or three feet under the surface, then the soil should be thrown out the whole length and breadth of the border, eighteen inches deep, and the bottom paved with stone or brick, so as effectually to prevent the roots penetrating through it to the water. Make the border on this, as directed hereafter; this will raise the top of the soil eighteen inches above the level of the adjoining surface.

## ASPECT FOR THE GRAPERY.

The house should front the south; a slight variation, provided it is to the east, so as to receive the morning sun, will be no objection.\*

In the Gardeners' Chronicle of 1847, page 734, is an account of some grapes exhibited at the Horticultural Show, "raised in the city of London, under a glass case, without fire heat, in an aspect nearly northwest, and where they received only about one hour's sun in the latter part of the day; they were a small black kind, and well colored, a fact corroborative of the opinion now entertained, that grapes should be sheltered from the direct rays of the sun upon the fruit."

Mr. Hovey, the Editor of the Magazine of Horticulture, does not agree with me, in the opinion before expressed, relative to the aspect for the grapery. In a notice of the first edition of this work, he says, "Not so, however, (all important,) the direction, 'that the house should front the south,' or 'a slight variation, provided it is to the east.' If forcing was only to be the object, this would hold true; but, for the ordinary culture of the grape, either with or without heat, it is by no means necessary. In our bright climate, any position but a north-

\* Cultivators of the grape have usually advised this position for the front of the house; several persons, who have had practical experience, would prefer that it should front south ten or fifteen degrees east, or even south-southeast.

"Every house for the purpose of forcing or growing fruit should stand on a foundation naturally dry or effectually drained. As to aspect, the standard principle is, to set the front directly to the south"—*Alcock's*.

ern one will enable the cultivator to produce the most delicious grapes." I have houses fronting northeast and southwest, (of course, with such aspect, the houses are glass on all sides,) east and west, southeast and northwest, and the other intervening points of the compass. I have carefully noted the effect of the different positions, and can, in the strongest language, recommend the aspect of south, inclining a little to east, as the best. Southeast is the next best; and east-southeast is preferable to southwest. The front of a house exposed to the west winds (which are our coldest in winter and spring,) is liable to a very low temperature till the sun suddenly shines upon it, and then comes a sudden and rapid accumulation of heat, very prejudicial to the welfare of the vines. I do not wish to be understood as saying that grapes cannot be grown in any but just such a position; I know that they can be; but the care requisite, and the chances of failure, are greater in ratio as the house in its aspect deviates from the best position. These remarks apply particularly to the northern states; in the middle and southern, it may be advantageous to avoid the great heat of the sun, if it is intended to grow grapes under glass, and that in such a position the best aspect for the front of the grapery may be west-northwest.

#### THE HOUSE

The common lean-to house is the best for forcing; from thirteen to fifteen feet high on the back, four feet on the front and twelve feet wide on the inside, are suitable pro-

portions; the length of it can be as desired, from twenty to one hundred feet or more.

The front of the house should be framed, the sills standing on, and secured to, stone, or locust posts, set four or five feet under ground, and eight feet apart, thus giving the roots freedom to roam at pleasure. The floor of the house should be on a level with the surface of the border. The back wall may be either of brick or wood. If the house is to be used for forcing fruit, it should have a double wall on the back. A span-roofed house is the best for a cold grapery.\* It should be, above the sills, on all sides of glass, and of the following dimensions:—twenty feet wide, and of any length desired; the upright sides above the sills, six feet high; the rafters should be

\* “In a span-roofed house sixty feet long, the south side glazed, the north, wood and asphalte, vines will not do well under the latter. Better glaze the north span; but, depend upon it, you would do better still were you to add another sixty feet to the length, and so form one hundred and twenty feet of roof facing the south, instead of employing the same quantity of glass for a house half the length with a double aspect; and the more especially, if it is intended for early forcing.”—*Gardeners' Chronicle*, p. 696, Oct. 1846.

A house of this construction is not suitable for forcing grapes, it being all of glass, and consequently so open to the admittance of air in very cold, windy weather, that it is very difficult to avoid such extremes of temperature as will be injurious to vines. If peaches or cherries are to be forced, such a house is desirable, and, for many kinds of pot plants, no better can be had. With respect to the correctness of the opinion expressed above, that it is better to build a house of double the length, with the same quantity of glass, it depends upon what uses the house is to be put to. As a cold grapery, and as a house where the vines are aided by artificial heat, (but not forced,) it is superior in its arrangements to the lean-to house, and, under the same circumstances, will perfect its crop ten or fifteen days sooner, and will yield a larger amount of fruit on a given space. It is more liable to damage from hail and frost. (See description of one of my span-roofed houses.)

twelve feet long ; this will make the height of the house, at the ridge-pole, or centre, on the inside, fourteen feet. The sills must be secured to stone, or locust posts, placed eight feet apart, and sufficiently deep in the soil to be free from danger of being thrown by the frost. Place the house fronting south-southeast. You may plant three sets of vines,—one in the centre, and one on each side. Upon a house of this description, the sun's rays will rest from morning until evening, and the crop will come rapidly to maturity.

At the time of writing the above, I had a span grapery twenty-two feet wide on the inside, (see view of this house,) which had four sets of vines planted in it ; at that time, it was a matter of doubt with me whether or not the vines were too much crowded ; since then, they have matured a fine crop of grapes, and the fruit on the two inside sets of vines was fully equal in quality and quantity to those where the roots were in the open border, and had more room to ramble and extend themselves. The present summer, these inside vines have upon them a very heavy crop ; each vine having shown from fifty to one hundred large and handsome bunches. They will not be allowed to mature more than from six bunches for the Syrian, up to twenty for the Hamburgh, being only in the fourth season. When the vines are fully established, the grapes will hang from the sill to the ridgepole, and present a beautiful appearance. If there is ample room, I would substitute this house for the one twenty feet wide, and with only three sets of vines. This house at the present time has now been four years longer in bearing, and the vines continue to do well, the inside ones being allow-



ed to bear ten to fifteen bunches each, the outside ones twenty to thirty.

#### GLASS HOUSES—HOW CONSTRUCTED.

Glass houses, for horticultural purposes, may be constructed in a great variety of forms, to suit the particular circumstances of the place, or ground where it is to be located.

It is important to have as little obstruction to the admission of light, and as little solid wood work, as is consistent with a proper degree of strength in the frame and sashes which are to support the glass, as possible. It is also important, in frigid climates, to guard against the admission of cold, or the escape of heat; consequently, the ends and the back, or the north side of the house, are usually built of wood, stone, or brick. Oiled paper and cloth, and other preparations on cloth, have been used for covering the roof, but with no good result; glass is the only article that can be used to advantage. To admit air, which is essential to the flavor of the fruit, and the well-being of the plant, the front lights, or windows, as also the upper part of the roof-sashes, are made to open out, or to run on rollers.

The curvilinear roof is approved by many. The following description of some houses of my own, which answer the purpose for which they were constructed perfectly well, and the manner of building them, together with the cost, accompanied with a view of these, is deemed sufficient for this treatise.

The account of the cost of two houses, built by other gentlemen, that are so very unlike mine in their dimensions, has been added, as they may be the means of affording the information wanted, in some instances.

The following is a description of the plan and the manner of building of the span-roofed grapery, which is represented in the drawing as in full fruit, in September.\* This is not heated by artificial means, and is what is usually called a cold house.

After the border was prepared, the stone posts were placed upright, the bottoms of them being three to four feet deep in the soil, and eight feet apart. Holes are drilled about one and a half inches in the sides of these stones, to which the sills are secured by pieces of iron, with the head flattened so as to be nailed to the timber, and the end bent to hook into the hole; the posts should not be less than six inches square. (Wooden posts, or brick piers, may be substituted for the stone; the former will soon decay, and, if the latter are used, they should be eight by twelve inches; the stones are best.) The dimensions of this house are as follows: twenty-two feet wide; fourteen and one half feet high, on the inside, at the ridge-pole; and a little short of eighty feet in length. On the posts are placed the sills, (as above described,) which are six or eight inches above the top of the

\* See frontispiece. The view was taken from the northwest door, and just within the grapery, as the object was simply to give an idea of the house, and the arrangement of the vines. No attention was paid to the proportions. This house is now used as a retarding one, and has a furnace and boiler, with pipes for circulating hot water, which are used in October, November, and December, to ripen and preserve the grapes.

ground; to the sill is nailed, covering about two inches of it and going down two inches into the earth, thick plank, finished with a bevel, like a water table. This, from the top of the sill to the earth, makes a solid work of at least twelve inches, which is necessary, as glass so near the earth would be very liable to be broken, and would also be covered with the soil spattered up by the rain. In winter, it will be prudent to tack or otherwise secure above this, boards, one foot in width, to prevent the breakage of the glass from the ice and snow falling from the roof.

The sills are of timber six inches square. All the measurements are after the work is finished.

The timber which forms the support for the rafters, and is immediately over the sill, and called the plate, is five inches thick by six inches wide. The studs or upright pieces, which support this plate, are of plank two inches thick by six inches wide, and are mortised into the sill and plate, and secured by wooden pins. The sill and plate are carried round the four sides of the house on a level, and are secured together; this makes the frame, thus far, very firm, and prevents the two ends from pressing in or out from any cause. Before the roof was put on, the plate was strengthened and braced, and kept in place by iron rods one inch thick and about fifteen feet apart, which are run through it and fastened by nuts, and crossing the house.

A cleat, five eighths of an inch in thickness and one inch wide, was nailed on the sill, and plate, and studs, to form a rabbet for the sashes; these are placed in, from the outer side, so that the sashes, when closed, are on the

same line with the outside of the studs. The corner posts are six inches square. The height of the studs, between the sill and the plate, is six feet one inch. (They must be made longer, to allow for the part used in the mortise.) The upright sashes are three feet ten inches wide, and six feet one inch long, and glazed with six by eight glass. The stiles, or side pieces of the sashes, are two and one fourth inches wide, and one and three eighths inches thick, and the rails, or top and bottom pieces, are two and three fourths wide; the inside pieces, of which there are four, are one and three eighths inches wide, and seven eighths of an inch thick; they are rabbeted to take the glass; they go from top to bottom. There are no cross-pieces used for glazing, but this is begun at the bottom of the sash, and the next glass lapped on the first about one fourth of an inch, (not any more, as it is more likely to break,) and so on, one above the other; all the sashes are glazed in this manner; there are five rows of glass to a sash. The sashes are strengthened in the middle by a piece of iron, one inch wide and one fourth of an inch thick, which is cut in even with the surface of the sash, on the inside, and secured with a screw in each stile and inside piece which supports the glass. These sashes are hung on hinges at the top, and open out, and are fastened on the inside with pieces of iron one fourth of an inch thick and one inch wide. This is about fourteen inches long, and it is secured to the rail of the sash by a staple; and, to hold the sash closed or open at any desired distance from two to ten inches, another staple is driven into the sill; the iron plate has holes drilled in it, at distances of two

inches from the one that is made to secure the sash, when shut, that it can be kept open to allow the air to enter the house as wanted, in greater or smaller quantity ; an iron pin secures this plate to the staple. On the ends, the lower sashes are made like the side ones, but they are all stationary. (In this house, only every other one of the sashes are made to open ; they can all be so, if desired.) The sashes above the plate are made to fit the inclination of the roof.

The roof is formed by rafters made of plank ; they are about thirteen feet long, two inches thick, and nine inches wide. A strip of wood, the length of the lower sash, is nailed to the rafter to support this on the roof. Another piece is nailed on the upper part to support the other sash ; this must be put on in a line with the lip on the lower sash to allow the upper to run over the under sash ; this lip is four eighths of an inch thick. On the top of the lower sash is a piece of hard pine for the rollers of the upper to run over, of which rollers there are two on each side of the upper sash ; they are of cast iron, secured to an iron plate, and screwed on the under part of the stile. The roof-sashes are not of the same length, the top ones being made shorter than the lower to run up and down more easily, the difference being about two feet.

The bottom rail of the lower sash of the roof is four and one half inches wide ; the top rail is two and three fourths inches ; the stile is two and one fourth inches wide, and one and three eighths thick ; this is nailed at the bottom to the plate, and on the side to the rafters.

In the upper sash, the stiles are the same as in the ar-

der, and the rails are both alike,—two and three fourths inches wide; the inside pieces in both sashes are of the same dimensions as the upright ones, and, in all, are bevelled off, instead of a moulding, to about three eighths of an inch in the center. Both sashes are strengthened with iron rods, let in even with the surface of the under part of the wood work, and screwed to each stile and inside piece, as are the upright ones; the glass is glazed in the same way.

The center, or ridge-piece, to which the rafters are let in and secured, is a plank two inches thick and ten inches wide; the groove for each rafter to rest in is about three eighths of an inch deep; they are fastened together by nails; between the rafters, for the sash to rest on, is a piece of plank. As the means of lowering or shutting the upper light, or sash, a staple is placed in the ridge-piece, to which is fastened the end of a line, that is then led through a side pulley on the sash, and thence through a standing pulley on the ridge-pole to the floor, where it is secured. (Or, what is better, have a weight of six, eight, or ten pounds attached, as may be necessary.) The pulleys are of iron, and screwed on to the wood. The finish of the ridge-piece is with a capping of boards, that are of a width to cover the upper part, or about an inch of the sash. The wood work of the house is simply planed smooth, and painted; there are no beads or mouldings. On the rafters, after the sashes are fitted in place, to make a finish, are capping boards of suitable width.

Two doors two feet eight inches wide, are placed op-



posite to each other at the ends ; they are of glass, and are made like the upright sashes.

The above is a description of the manner of building the ends and one side of the grapery ; the other half is made, in every respect, in the same way.

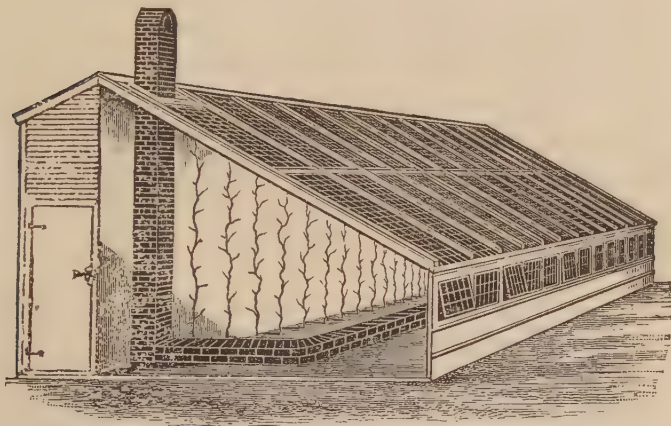
The expense of building this house, including the preparation of the border, which is fifty feet wide, and the vines, some of which, being rare, cost high, was about \$1,000.

The following is a description of the manner of constructing a lean-to house with a room extending the whole length of it on the back, or north side, to be used for the furnace, or other purposes. (See cut.)

The sill should be set on posts of stone, (both of which must be six inches square,) and to extend around on all sides of the house alike ; the posts should be three or four feet in the earth, and eight feet apart, and the tops of them eight to twelve inches above the surface, to keep the sill from rotting. On this should be nailed a plank, extending into the soil an inch or two. You may make the width of this house twelve or fourteen feet ; that is, the part of it which is to be covered with glass, and the back room from four to seven feet, as may be wanted. A partition which is to be made here will require a sill and posts, in the same manner as the other parts of the building.

The front plate should be four feet from the top of the posts, and four inches thick by six inches wide ; the upright sashes, two feet four inches high, and about three feet ten inches wide, and one and one fourth inches thick, hung on the top with hinges, and made to open

out. The studs which support the plate are to be of a length proportionate to the sashes, and the wood work below them, and mortised in. The whole finish of the front, and the make of the sashes, and the manner of fastening them on the front and on the roof, are to be the same as detailed for the span house; the rollers on the windows, and the irons to secure the front sashes, are made exactly in the same manner, and put on in the



LEAN-TO GRAPERY.

same way. Under the front sashes, there must be about eighteen inches of solid wood work joining on to the plank which goes from the sill to the earth.

The rafters should be about seventeen feet long, and ten inches deep by two inches thick, to be finished and let into the ridge-pole, in the same way as in the span-roofed house. The back of the house should be framed, boarded, shingled, and plastered on the inside. The

back roof, which is to decline at a proper pitch, should be boarded, shingled, and plastered. Under the ridge-pole must be the studs to support this, and these should be twelve feet in the clear between the ridge-pole and the sill, and here should be a double partition of plaster to separate the front of the house from the back. The rafters and the ridge-pole must be finished with a capping board. There are to be two doors, one at each end, two feet eight inches wide, of glass; the ends are also best of glass,\* and the sashes should be permanently secured. Gutters may be placed under the roof to lead the rainwater where desired. Solid brick work may be substituted for the support of the sills, leaving spaces six inches square for the stems of the vines to be brought through. The back wall may also be built of brick or stone, but they would be more costly constructed in this way.

A house built, as above described, on stone posts, in the plainest manner, but of good materials and workmanship, and well painted, would cost about eight dollars per running foot. The heating apparatus would be in addition; also, the expense of preparing the border, purchasing the vines, and the planting of them out. The cost of the border, and of the heating apparatus, must vary according to the natural soil, and the purposes to which the house is to be put. Making a border twenty-five or thirty feet wide, and three feet deep, is an expensive work, and will vary from one to two dollars per foot. The same remark will hold true with the heating of the

\* Double windows, or shutters, should be used on the ends, if the house is for forcing

house; a grapery forced in winter, (that is, in December,) will, in a severely cold climate, require a very expensive apparatus; a furnace and flue, for forwarding and protecting the vines in the spring or autumn, is a simple and cheap affair, and the cost will vary, according to the amount of heat required, from one dollar to three dollars per foot.

I think ten dollars the running foot is the lowest price at which a plain grapery, with a simple furnace, can be built, with vines planted, and all complete; and this cost can be increased, according to the material used in the construction of the building, and the finish put upon it, to twenty dollars the foot.

The following is an account of the cost of a house constructed on the most economical principle, furnished me by a friend residing in a city adjoining Boston:—

“I send you the account of the cost of my grapery, which is thirty-two feet in length, twelve feet in width, and thirteen feet high on the back, and three feet on the front; and this front is wood work, supported by wooden posts.

“ Cost of sashes, . . . . .	\$25 00
“ “ glass, . . . . .	14 00
“ “ glazing, . . . . .	21 00
“ “ frame, painting, &c., . . . .	75 00
“ “ flue, . . . . .	50 00
“ “ border, . . . . .	40 00

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Whole cost, . . . . . \$225 00

“My grapery is placed against the back part of my

house, which would make some difference in the expense. I have not included the vines, nor the wires for the vines to be trained to."

It will be noticed, that the cost of the back of the house is saved in this instance. This would vary according to the finish and kind of back used; if of the cheapest kind, wood and shingles, and plastered on the inside, with a small furnace room, it might be built for seventy-five dollars; but, if a room for the furnace and for the coal was made running the whole length of the grapery, which would be proper in a cold climate, if the house was to be used for forcing, the expense would be considerably greater.

The cost of a house of this kind, with the back wall, would not be less than ten dollars the running foot, and this would include every thing, the vines of common kinds, and the wires or rods for the trellis.

The price of labor, in different places, would cause some variation in this sum, and a more extensive furnace room or building on the rear would add from one to two dollars per foot to the cost, according to the kind of room or wall constructed.

The following is an account of the cost of a small grapery, on all sides of glass, with a brick foundation, furnished me by a gentleman of Salem:—

"All the space which could be spared for the purpose was seventeen square feet. The house is seventeen feet in length by nine feet in width. The brick foundation is eight inches thick, and two feet high, (with four hanging windows in front, of three panes each, seven by nine glass,) on which is placed a sill six inches deep. There



are five rafters, with a corresponding number of posts on the back of the house, framed into a plate at the top. The inclined sashes are permanent; the angle of inclination is fifty degrees. The vertical sashes on the back side are nine feet in length. The ventilation is from the back, the ends and the front.

“The border is eight feet wide, well-elevated, fifteen inches deep exclusive of a substratum of bones, nine inches deep.

“There are five front vines, which are planted on the outside; four back vines in the alternate spaces, and one vine at each end, are planted on the inside. The entrance is at the end of the house by a porch projecting three feet, and containing an inner lattice door for ventilation.

“The house would be more airy, and better in every respect, if twelve feet in width. The border also, if possible, should have been twelve or fifteen feet wide, which would obviate the necessity of an annual manuring with guano, in order to carry off the crop well.

“One hundred and twenty-five pounds of well-ripened grapes can be safely calculated upon from such a house as the above, as a permanent annual crop; say five front vines at fifteen pounds each, seven back and end vines at seven pounds each. With a wider border, the front vines would ripen equally well twenty pounds each.

“Cost of the whole, including vines, preparation of border, and all expenses, two hundred and seventy-five dollars; or, about sixteen dollars the running foot. The grapery is not heated by artificial means.

“This house is built on a brick foundation, and the

finish is of the most complete kind ; fifty or seventy-five dollars might have been saved, if desired, in the labor bestowed on the wood-work."

#### FURNACE FOR HEATING THE GRAPERY.

In remarks on forcing, it has been intimated that the simple furnace and flue are, at all times, a valuable aid in the grapery. They are of easy construction, and may be made of these dimensions, and after this plan.

The furnace should be sunk in the earth so that the top of it may not be over ten or twelve inches above the floor of the house. It should be so placed, that the whole of the heat may be given out in the grapery, the door and end being in the furnace-room, so that the smoke and dust from the fires may not injure the foliage of the vines. The pit for the furnace should be about four feet wide, and three or four feet deep, and of convenient length for working the fire. The furnace should be two feet or two feet six inches wide, and about three feet in length. The ground should be paved with stone or brick for the foundation ; on this build the furnace, leaving ten inches in height in the centre, and of the length and width of the grate for the ash-hole. (See end view of a greenhouse furnace.) Now set the grate, which will require about two and a half inches of space ; build up the brick work, leaving a space for the fire of about twelve or thirteen inches high by ten or twelve inches wide, and two feet four inches deep on the inside. The door should be of cast iron, and on a cast iron frame.

which should be set in the masonry in building. The grate endures the heat from the anthracite coal better if cast in separate pieces, half an inch thick, and two and a-half inches deep, with two spaces of about an inch in length, at proper distances from the ends, where the thickness is three-fourths of an inch, the ends, also, being of this size. The sides of the fire-place must be built of fire brick; the top must be covered, also, with tile, or brick of this material, if coal is to be used. The tile on the top should be covered with one or more courses of brick. My furnaces have five or six, to retain and prevent too great escape of the heat. In the cut, the top of the furnace is represented as arched; this is not necessary, but it may slope from the front to the back, where it enters the flue, three or four inches, with benefit to the draft. At the further end of the furnace, the flue should commence, and should have a rising of certainly two or three feet from the grate, to insure a good draft; the flue should run to the front of the house, and thence along this, at the distance of twelve inches from the wall. This flue should be of brick, carefully made, to prevent the escape of smoke or gas; it may be eight to ten inches square on the outside, or it may be fourteen inches wide, and eight inches deep, and covered with tiles; either answers perfectly well. If the house is a very small one,—less than twenty feet,—the flue may return on the back of the house, and the smoke be carried off by the chimney near the furnace. If the house is over twenty feet in length, the better way will be to continue it around the end to the back wall, and up by a chimney out of the roof, as represented in the cut of the lean-to house.

The flue, for the first twelve feet after leaving the furnace, should be built on two or three courses of brick, (or a stone foundation may be substituted,) from thence to the chimney either on plank, (which is preferable on account of dryness,) or on bricks laid one or two inches apart; one course of brick is sufficient for the floor of the flue. I usually have the first few feet of the sides of the flue built with the bricks laid flat, and, after this, on their sides, as represented in the lean-to house.

#### HEATING APPARATUS FOR CIRCULATING WATER ON THE LEVEL PRINCIPLE.

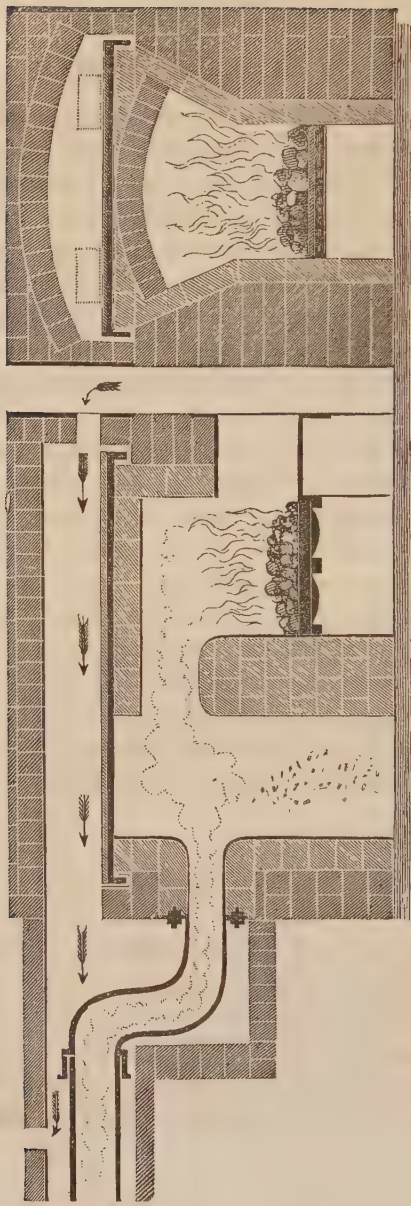
When the house is to be heated with hot water, (which I prefer when a great and steady heat is required through the whole winter,) the furnace and flue should be built and arranged in the same way as detailed in the preceding article; but, instead of covering the furnace with tile and brick, the boiler will be used. This may be of cast iron, or of sheet copper, and of proper size for the furnace. It is necessary to have fifteen or eighteen inches depth to this, that ample space may be allowed for the pipes, one above the other, on the side. The lower one should enter as near the bottom as possible, and the upper one as near the top. The principle upon which the water acts is this, that hot water is lighter than cold; consequently, when this becomes heated by the fire, it rises to the top and thence to the pipe; the cold water in the lower pipe comes in to fill the space of that heated, and the circulation commences, and is more

rapid when the boiler contains but a small quantity of water, provided the pipes are always full, which they must be. But it is essential for a rapid circulation that ample distance be allowed between the pipes, which may be from four to six inches in diameter; the lower one should be arranged first, and supported and kept in place on a perfect level, by brick or stone. Above this, should be the upper and warmest one, properly levelled and arranged. You may place the pipes on either side of the furnace, but the side next the front of the house is usually the one considered best; I would recommend four to six inches for the space between them. I have in my houses, at the extreme end, a tank containing thirty gallons or more of water, to which the pipes are attached, in the same manner as to the boiler; but this is not necessary, though preferable. The pipes may connect at the end by an elbow, and they work equally well; but a tank at this place with a quantity of water, which becomes heated, is of service, as this is the coldest part of the house. An opening must be provided on the top of the boiler, or tank to fill these with the water.

#### THE POLMAISE SYSTEM OF HEATING.

Much discussion has been held of late in England, relative to this mode of heating green and other houses for horticultural purposes, and some curiosity has been excited in this country as to what the system is. The principle is similar to that upon which many of our churches and dwelling-houses have, for many years, been warmed.





THE POLMAISE SYSTEM OF HEATING.

GREEN-HOUSE FURNACE, THE END  
OR DOOR SIDE.

It is the same with air as with water,—the heated becomes the lighter and ascends ; consequently the cold or heavier descends, and fills the place vacated.

In the view of the furnace which is given,\* the Polmaise system is attached, the arrows showing the current of heated air over the furnace, and the bending one the rushing in of the cold air to fill the space, and thus the circulation is kept up while the heat is in the furnace. The end view shows the hot-air chamber over the furnace ; the two dotted places in this are the openings for the cold air.

The side view shows also the smoke-flue and the finish of the furnace, with a dead air chamber to receive any ashes that may pass from this and prevent their entering the flue. One opening in the covering of the Polmaise, for the escape of the heated air, is shown, and this covering may be continued as desired, and the heat led by brick, or copper, or other pipes to any spot desired. In the hot-air chamber may be placed pans to contain water, that the heated air may have the required moisture ; these can be regulated at pleasure, having more or less, or none at all, as the state of the house requires. For instance, in the early stages of forcing, you would require all the moisture that could be obtained in this way. If, with such an apparatus, a fire was made to preserve the fruit from frost or other causes after it was ripe, probably no moisture at all would be wanted.

\* This is copied from the *Gardeners' Chronicle*, with some slight alterations.

POLMAISE SYSTEM ATTACHED TO A FURNACE ALREADY  
CONSTRUCTED.

I have had attached to a furnace already constructed, (and that has been some time in use,) of dimensions similar to the one described, a system of circulation of the air which has proved very successful. It is very simple. The furnace has been enclosed, on the three sides within the house, with brick work, leaving two or three inches of space only for the hot-air chamber on all sides, and this brick enclosure is continued along the sides of the flue, (where the heat is great,) for about ten feet. The whole of this brick work is then covered with stones, placed two inches above the furnace, and the heat is led into any part of the house by a brick flue, covered on the top with stones and closed at the ends, with two openings near the extremity for the hot air to flow out on each side. An opening is left, about three inches square, on the level of the floor on each side in the brick work that surrounds the furnace, close to the back wall of the house, to admit the cold air, which commences to rush in as soon as the furnace and flue become warmed; and this circulation continues for hours after the fire has burnt out, the brick work retaining the heat a great length of time. The cost of this apparatus was about twenty-five dollars additional.

## PREPARATION OF THE BORDER.

The border should be twenty feet wide, for each set of vines,—if thirty feet, the better,—and two and a half or three feet deep; If you have but little room, you can manage to grow very fair grapes with twelve feet of border; but, in this case, you must not plant the vines so close together.\* The following course is recommended in preparing the border:—

If the soil is a good loam, begin at one end and trench it; mark off ten feet the entire width; throw out the soil two feet deep; if bones, or the carcasses of animals can be had, cover the bottom well with them; if these are not readily procured, slaughter-house manure may be substituted;† mark off ten feet more of the border, and cover this manure with part of the soil from it; upon this, put an inch or two of oyster shells, or old lime rubbish, mixed with broken bricks; over this, put some soil from the border; then a good covering of cow manure; upon this, a slight covering of loam again, followed with a good portion of oyster shells, or the substitute; and over this, a thick covering of stable manure, well rotted; finish with a covering of the loam.‡ The whole length

\* See Planting the Vines.

† See Manures.

‡ *Drain for the Border.*—If drains are necessary, they should be made after this plan: the main one to be of brick, extending the whole length of, and on the outside of the border, the bottom of this being covered with stones not less than one foot deep. On these, every six feet, should be smaller drains of brick, tile or stone, leading to the main one, and this can be carried to any convenient point. I have never found it necessary to form these under any border, stones at the bottom answering every purpose. Very few situations can require them in this country.

is to be made in this manner, in alternate spaces of ten feet each trenching. After it is finished, the border should be three feet six inches deep; it will settle to less than three feet in a few months; any soil left, after it is finished, can be carried off.\*

Dr. Lindley is of opinion, that, in the draining of the border, the improvement is more by the admission of air and heat than by the removal of water.—*Gardeners' Chronicle*, 1847, p. 651.

\* The above is the method by which I have twelve thousand square feet of border prepared.

After throwing out the soil, the materials are placed in the border, and following each other in these proportions: First, nine inches of the strong slaughter-house manure, (or the carcasses of animals, or bones, etc.) four inches of soil, two inches of shells, four inches of soil, six inches of cow manure, four inches of soil, three inches of shells, four or five inches of stable manure, and six inches of soil.

These articles were thrown as roughly as possible into place, and not levelled; the first manure, for instance, in some places, would be only six inches deep, and in others, ten or twelve, or more, just as it would happen to fall from the shovel, the above measurements being near what they would have been, if on a level. Avoiding, as much as possible, the forming of layers, which, at first sight, would seem to be the case, but the juices of the strong manures would be all imbibed by the soil placed amongst them, and rendered rich accordingly.

In the strong manure, at the bottom of the border, no care was taken to have the same material throughout; but, as they could be procured, they were placed in position, as fresh as possible, (before they became offensive.) If the carcass of an animal was had, it was simply quartered, and laid in and covered with the soil. If the entire skeleton of the horse was had, (of which there are, in this border, at least forty,) it was similarly placed, as also the slaughter-house manure; but when, as was the case in some parts, bones were used which had been boiled, the floor of the border was covered with these from two to four inches deep, and the freshest cow manure which could be had was placed to the depth of from two to four inches upon them, and this again was covered with a like quantity of bones, which were stuck into the manure in every direction, care being taken that they should not lie flat on its surface; the object in view, being to have as rich a material in this case, as when the other manures were employed. Sometimes, old mortar and brickbats were mixed with the shells, and used in connection with them.

The proportions recommended for this border, are one-half loam, one fourth bones, or other strong manure, one-eighth oyster shells, or lime and brick rubbish, and one-eighth rotten stable manure.

Before planting the vines, the border should be spaded over, to mix well the top substances, being careful not to disturb the strong manures at bottom, as these substances, when decomposing, would destroy any of the roots of the vine with which they came in contact.

Should the soil be poor, decrease the proportion used in preparing the border, and, in the same ratio, increase the manures, or substitute the top soil of a loamy pasture.

If the soil is very poor, or unsuitable for the purpose, so as to require to be removed entirely, then a compost, prepared thus, is recommended :—one half to be the top soil of an old pasture ; one quarter to be bones, or some other strong manure ; one eighth oyster shells, or lime and brick rubbish ; one-eighth rotten manure ; these articles thrown together in a heap, and so to remain until

In preparing this border, there was found a difference in the natural soil, part of it being a very rich yellow loam, several feet deep, and part of it a gravelly or slaty soil, not more than two feet deep, upon a bottom of rotten rock. The rich soil did not require as much manure as the thin, and received less, but more shells, and old mortar, and bricks ; and the thin slaty soil received more than the above proportions of manures, and less of the shells, etc. This border is on a hill-side, and these are the extremes of soils at the top and bottom. Thus situated, there was no occasion for rocks, or any kind of drainage at the bottom of the border, and, consequently, none was used. In a border since made, to the above ingredients, I have added a good proportion of charcoal screenings, and, when they can be had conveniently, they should always form a part of the compost, as being valuable, tending to keep the soil porous and light, and, also, as affording moisture in seasons of drought, and as absorbents of ammonia from the atmosphere.



decomposed and amalgamated, when they should be placed in the border, and thrown loosely together. My borders, having the most slaughter-house manure, or whole bones of animals in their composition, still continue, as they ever have done, to produce the best fruit and the largest crops.

It is unnecessary to attempt to give rules for every kind of soil. One must use his own judgment, and make his border to consist, as near as can be, of the above ingredients. He must bear in mind that, if his soil is a stiff, clayey loam, he must add freely of such materials as will lighten and give permeability to it. If the soil is light, sandy, or gravelly, with the manure should be added a proportion of clay or of clayey loam. The rich alluvion soil, abounding in our western and south-western States, will not require any of these strong manures. If anything is requisite to improve them, it must be shells, charcoal, leaves, small stones, or gravel,—such materials as will loosen the soil.

If a compost is to be prepared, as is usually recommended by European writers on the cultivation of the grape, by taking the top soil of an old pasture, &c., and throwing them into a heap until decomposed, two or three years are required before the border is in readiness for the vines; whereas, by the plan which I have adopted, the vines may be planted immediately, making due allowance in the placing of the vine for its settling, which will be in proportion to the freshness of the manures, or the carcasses of animals that enter its compost, which, in dissolving, diminish greatly, and this in ratio to the flesh upon them; the large bones will change but little

for many years. What is wanted in a grape border, is a rich, permeable soil, enduring in its nature, in which the roots can ramble and spread freely. Too much water will injure the fruit; a deficiency of moisture will prevent its swelling off properly

The following account of Soils and Manures, as recommended by several eminent cultivators, is annexed:—

Speechly recommends “the soil to be one fourth part of garden mould, a strong loam; one fourth of the swarth or turf from a pasture where the soil is a sandy loam; one fourth, of the sweepings and scrapings of pavements and hard roads; one eighth, of rotten cow and stable-yard dung mixed; and one eighth, of vegetable mould from reduced and decayed oak leaves. The swarth should be laid on a heap, till the grass roots are in a state of decay, and then turned over and broken with a spade; let it then be put to the other materials, and the whole worked together, till the separate parts become uniformly mixed.

“A garden, and consequently the hot-house, is sometimes so happily situated in regard to soil that it seems, by nature, adapted to the growth of the vine. The soil in which I have known the vine to prosper in a superlative degree, without artificial aid, was a kind of rich, sandy loam, intermixed with thin beds of materials, like jointed slate or stones, and so very soft in its nature as almost to be capable of being crumbled between the fingers. The following extract from Virgil, on this topic, will be deemed neither inapplicable nor disagreeable to the candid reader:—

But where the soil, with fat'ning moisture fill'd,  
Is clothed with grass, and fruitful to be till'd;  
Such as in cheerful vales we view from high,  
Which dripping rocks with rolling streams supply,  
And feed with ouze ; where rising hillocks run  
In length, and open to the southern sun ;  
Where fern succeeds, ungrateful to the plough,  
That gentle ground to generous grapes allow.'

“ As the vegetable mould from decayed leaves cannot always be obtained, by reason that the leaves require to lie two years before they become sufficiently putrid and reduced, it may be necessary to substitute some other ingredient in lieu of this part of the compost. Rotten wood reduced to a fine mould ; the scrapings of the ground in old woods, where the trees grow thick together ; mould out of hollow trees, and sawdust reduced to a fine mould, provided it be not from wood of a resinous kind, are, in part, of a similar nature with vegetable mould from decayed leaves, but are neither so rich nor powerful. It is very probable that there are various other kinds of manure, that may be introduced into a compost suitable for the vine with as much effect as the former ; as blood, the offal of animals or shambles, horn shavings, old rags, hair, shavings of leather, and bone dust. This last is exceedingly proper, as, at the same time that it gives a lightness to the soil, it contributes to its fertility. I may also add to the former the dung of deer and sheep, as, likewise, (poudrette) night soil. But please to observe, that many, if not all, of the above recited manures will require time to meliorate, before they can be introduced and incorporated with the other part of the compost. The dust, or dirt, from roads consists

principally of the following particulars: first, the soil of the vicinity; secondly, the dung and urine of horses, and other animals; and thirdly, the materials of the road itself, when pulverized.

“After having specified manures known to be friendly to the vine, it may not be improper to name some that seem hurtful to it. Soot, wood ashes, pigeon and hen dung, would all, I think, be too hot for the roots of the vine. These are manures that come immediately into action, and are more properly calculated for top dressing. Pond mud and moor earth would probably be too cold, and the latter might canker the roots of the vine, and therefore, on that account, had better be omitted.

“In the autumn, to prevent the roots of the vine from being injured by the frost, they should be mulched to the thickness of three or four inches with strawy manure. A little very rotten manure may be spread all over the border. This is to be done the first season after planting.

“By the end of the second year after planting, the vines will have extended their roots to almost every part of the border: and as, at this tender age, the roots are very liable to receive injury by severe frosts, I would advise the borders to be covered the thickness of three or four inches with long, dead, strawy dung. This is to be removed in the spring; a little of the very rotten may be permitted to remain, as this, with the addition of a little rotten cow dung, should be worked into the border every spring.”

Extract by Speechly from Marshall's Travels, which he introduces by saying that he hopes will prove acceptable,

as the kind of manure, and the best time of applying it, are of the utmost importance:—

“My landlord told me, that he had an intimate acquaintance, a vigneron, at Verzenay, who was reckoned one of the most careful managers in all the country, and that he would give me a letter to him, requesting him to give me all the information I desired. This I readily accepted, and proceeded to Verzenay, where I inquired for the vigneron the landlord at Chalons had written to. We walked directly into his vineyard, which was dunging, in trenches made for that purpose. The season for this, most approved here, is directly after the vintage, and to be finished before the winter sets in. It is all carried in on the heads of women and children in baskets, and they empty their baskets in trenches dug for that purpose, which are doing at the same time, and others spread it in the trenches, and cover it with mould immediately. Sometimes the trenches are made along the center of the intervals, at others, they are dug between the plants.

“The sort of dung they prefer most is cow dung, that is, the cleanings of the cow-houses, which are well littered with straw or stubble for that purpose; horse dung is also used, but only on stiff soils. They reckon that five to eight hundred baskets are necessary for an acre of vines. The baskets, I reckon, hold about half a bushel, and this manuring is repeated every four or five years. Making dung is so much attended to throughout all the wine country, that every means is used to increase the quantity. Much cattle are kept, especially cows, and housed as much as possible. These are fed by every means that

can be taken. Every weed, every blade of grass that arises, is saved with as much care as the grapes, and given to the cows. Dung is, however, sometimes laid on in March, but it is not thought so proper for that work as autumn. Over-manuring is thought prejudicial. But this depends on the soil ; for some lands are so deficient in natural fertility, that, unless they are manured more than commonly, they will not yield a crop ; they lay a thousand baskets, and sometimes even twelve hundred on such."

Speechly says that the vine requires "a plentiful supply of water during summer, particularly in a hot, dry season.

" 'It was planted in a good soil by great waters, that it might bring forth branches, and that it might bear fruit, that it might be a goodly vine.'—*Ezekiel*, xvii. 8.

"In hot countries, the vine is said to grow the most luxuriant in a situation which is near the water, but it is generally allowed, that the flavor of the grape from vines in such a situation is much inferior to that of grapes growing in a dry soil.

"During winter, I have frequently watered the vine border with a thick, black liquor, the drainage of the dunghills ; and, though this practice was intended solely to enrich the soil, yet it is not improbable but this powerful liquor, by being impregnated with saline particles, may communicate a warmth to the roots of the vine during the winter, and thereby prove serviceable in that respect also. However that may be, from the uncommon vigor of the vines, I have been led into a belief of the utility of this practice. But let me at the same time ob-



serve, that I have always applied this powerful manure, (if I may so call it,) with great caution. I have found the beginning of winter the most proper time for using this kind of manure; and then I only venture to give two or three plentiful waterings, fearing that, if this were to be applied either in the spring or the summer, or even in too great quantities, it *might* tend, from its great power, to cause the leaves of the vine to change from a green to a yellow hue. The drainage of the dunghill is the very strength and power of the dung; for water, constantly filtering through stable yard dung, certainly robs it of the mucilage and saline particles with which it greatly abounds, when newly made; and especially such dung as has lain a considerable time in the stable, and imbibed a large portion of the urine of the horses. The saline particles are increased by the fermentation, therefore the first extract obtained from the dung, after it has undergone its fermentation, may be justly considered as the essence of the manure.

“Although soils of different qualities admit of improvement by various modes of practice, yet, without the aid of manure, the farmer would find his utmost exertions of but little value. And though some have endeavored to prove that the earth, when duly pulverized by the action of the plough, does not require manure, (Mr. Tull, in his *New Husbandry*, tells us that, where the ground is properly managed, manure is an useless article; but his opinion is now generally and justly exploded;) yet experience tells us that it is the very life and soul of husbandry; and, when judiciously applied on almost every

kind of soil, its effects will seldom disappoint the expectation of the farmer."

By an experienced grape grower.—This person says the border "should be from thirty to forty feet in width, and should be formed of loamy soil, sharp sand, and at least a fourth part of well rotted horse dung."—*S. A. M., Loudon's Magazine*, vol. 10th, p. 266.

By A. Forsyth.—"At the back wall of the grapery, the soil is prepared to the depth of six feet; and at the further extremity of the border, (sixteen feet wide,) there are three and a half feet of soil composed of equal parts of the following soils: turfy loam, (the top spit of a very old undisturbed piece of pasture, occupied as a rick yard,) two parts; rotten dung, one part; lime rubbish, one part; gritty mud, (the same as road drift,) one part."—*Loudon's Magazine*, vol. 10th, p. 547.

By Jasper Wallace, gardener to William Forsyth, Esq., of Cayton.—"The situation for the border, if not naturally dry, must be made so by draining. The best bottom, in my opinion, is one formed of large flat stones got from the top of a lime rock, which is of a nature that would assist the growth of the vines when they reached it. The border ought not to be deeper than from two feet to three feet; as, if it is more, the roots of the vines will get away from the action of the summer weather, and the good of the manure that may be put on the surface. I would have the border formed of decomposed turf and good black earth, with a sufficient quantity of decomposed cow dung, vegetable mould, and slaked lime, well mixed by frequently turning it, and which should be allowed to lie for two years, if convenient.

“With regard to the surface manuring of the border, as soon as the wood of the vine is fully ripe, it should be forked over, about two inches deep, with a blunt dung-fork, and six inches of the best cow dung should be put on. To supply liquid manure for the border of one house, get one bushel of common salt, as much black soap, and a quantity of the drainings of stable yard dung, all put into a large cask, and allow it to stand for a week; after which, mix it with a large quantity of rain-water, and put it regularly over the border; then put on as much common earth as will completely cover the dung, but no more.”—*Loudon's Magazine*, vol. 12th, p. 244.

Mr. Loudon, in his *Encyclopedia of Gardening*, after quoting the composts, as recommended by Speechly, Abercrombie, McPhail, Nicol, Griffin, and Judd, adds these words: “The depth of the border must be regulated, in all cases, by the subsoil, and the climate. Where the former is moist, and the latter is cold, the shallower the soil is, the better; on the contrary, where the subsoil is perfectly dry, and the climate hot, as in the south of France, the depth may be unlimited.”—*Article 3564*, p. 778.

For the composts for the grape border, as recommended by Abercrombie, see soil used by him, *Open Culture*.

“Fresh, light hazel loam, mixed with lime rubbish, leaf mould, and a small portion of decayed hot-bed dung,” is advised by John Rogers, editor of the *Fruit Cultivator*, published in London, 1837.

“An excellent vine border may be formed upon an impervious dry bottom, two feet deep, and composed of

light, rich, loamy earth, enriched with rotten manure, ground bones, and lime. It is better to extend the border in breadth than in depth."—*Charles McIntosh*, London, 1839.

Clement Hoare, in an after-edition of his work on the Grape Vine, recommends that, for winter-forcing, the vines be planted on the inside of the grapery, and, to do this properly, he says the soil should be removed from the inside of the house, which is to be supported by a wall of solid masonry on all sides to prevent the roots of the vines penetrating it to the outside. After the soil is removed, his plan is to pave the ground with brick, set in cement, and this space is intersected with brick work, with openings occasionally, for the roots to penetrate and ramble. This brick work is to be a support for the bricks which are to cover the whole, after completion. The substances, in which the vines are to grow, are broken bricks, lumps of mortar, charcoal, and bones, in equal proportions, soaked in urine. His idea is, that these materials, once moistened and then placed in the situation prepared as above, can never become dry; that the moisture of the earth will keep the whole mass sufficiently supplied with water, and that it never can have an excess. In planting the vines, the roots are to be carefully spread out, freed from all soil. It is advised to have two pieces of woollen blanket, which are to be first soaked in soap suds, to plant the vines in,—one to be spread on the bottom and the roots laid on this, and the other to cover them; when this is done, cover over with the compost above named, and, when the whole is paved over on the top, the work is complete. This, it will be observed,

is planting without a particle of soil. I have never attempted to grow vines after this plan, and most surely shall not; still, it is to be presumed, occasionally, a plant may succeed. Where the soil is very wet, the plan, *with the addition of one half of good loam* to the compost, doubtless would do well. In the damp climate of England, this compost would probably retain sufficient moisture, and never become dry, as Mr. Hoare says; but, in the severe droughts of the United States, in most situations, the plants would die.

In preparing a suitable soil for fruit trees in general, De la Quintiney says: "The best earth for this use is a sort of rich sandy loam, which may be taken from near the surface of some rich pasture ground, where cattle have been fed or fothered, or of some rich sheep-walk, where there is a depth of earth, and if it is mixed with a little old mellow earth, or the like, it may do well; or cow or horse dung may likewise do well, if it is quite rotten, so as to be like earth; but of this a small quantity, as one part in four or five, and thoroughly rotted." p. 9.

New earths he also recommends as suitable for trees, &c.; these he defines as being "such as have never served for the nourishment of any plant, or else have been a long time built upon, &c.; likewise, earth from some rich pasture-ground, of a sandy, loamy nature, where cattle have been a long time fed, is of excellent use for most sorts of plants; especially if it has been thrown up in heaps to meliorate, and has taken the winter frosts, it will be so much the better." p. 17.

"Now since the great defects of earth are too much

moisture, coldness, and heaviness, also lightness, and an inclination to parching, so amongst dungs, some are fat and cooling, as that of oxen and cows; others, hot and light, as that of sheep, horses, pigeons, &c. And whereas the remedy must have virtue contrary to the distemper it is to cure, therefore, hot and dry dungs must be used in cold, moist, heavy earths, and oxen and cow dung in clean, dry, light earths, to make them fatter and closer. Not that these two sorts, though the principal, are the only materials for the amendment of earth; for, upon farm lands, all sorts of stuffs, linen, flesh, skin, bones, nails, hoofs of animals, dirt, urine, excrements, wood, fruit, leaves, ashes, straw, all manner of corn or grain, soot, &c.; in short, all that is upon or in the earth, (except stones and minerals,) serve to amend and better it." p. 29.

"I look upon sheep's dung as the best of all dungs, and most promoting fruitfulness in all sorts of earth. La poudrette and the dung of pigeons and poultry, I seldom use,—the one is too offensive, and the other is full of small insects prejudicial to plants." p. 31.

"Vines thrive and produce better grapes in certain dry grounds than in cold strong earths." p. 34.

"When the vines show any diminution of vigor, refresh the roots with dung or soil." p. 156.

The following articles are from the *Gardeners' Chronicle*, edited by Professor Lindley. Some of them are answers to correspondents, who have asked information upon the points replied to:—

"Your vine border, covered with frames, should be well watered with manure water before you begin fore-



ing, and occasionally till the grapes begin to color." 1846, p. 680.

"*Soil for the vine border.*—Good turfy loam and dung, with some peat, two and a half feet deep. It will be better for the vine if no other plants are allowed to root in the border." 1846, p. 696.

"Calcareous soil suits vines better than silicious." 1846, p. 712.

"Turfy maiden loam, made into a compost with bones and plenty of cow dung, will make a good border; but the situation being very dry, you must take care to mulch and water well in summer." 1847, p. 72.

"X, Y, Z, (Hants,) says; To apply a manure to a vine, it is necessary to dig a small trench around the roots of this plant, (which is best done in the autumn, after the fruit is gathered,) then to apply a bucket of ox-blood, and pile up the earth over this and around the stem of the plant."

"J. B., (Lynn,) says; I have collected in barrels the whole quantity of slops from the house, consisting of chamber lye, soap suds, &c., and, when the mixture begins to emit an offensive odor, I have saturated the border with it."

"J. L. Snow says: You may, with safety, use the above liquid especially if the border be well drained." 1847, p. 509.

"In a communication which was read at the Horticultural Society's meeting, it was mentioned that Mr. Ayre's border was made wholly above the surface, and formed first of a layer of concrete three inches thick, on a sloping bottom, with a line of drain pipes opposite each raf-

ter; over these were then laid from one foot to eighteen inches in thickness of brick rubbish, intermixed with oyster shells and rough bone dust, materials which were also freely mixed with the soil. The latter was stated to be turfy loam mixed with leaf mould. At present, the border is only about six feet wide and about eighteen inches deep; but it was mentioned that it is intended to add four feet more to it this autumn, and, when finished, which will not be for some years to come, it will be twenty feet in width. It was stated that the great object kept in view, in forming this border, was to make it porous rather than rich, the latter being left to top-dressings and liquid manure." 1847, p. 607.

"Pigeon manure, mixed with fresh soil, will certainly improve your vine border."

"You may apply manure water any time, except when the crop is ripening off."

"Large bunches of grapes have been produced on a vine, of which the roots came in contact with the drainage in a court-yard of an inn, frequented throughout the year." 1847, p. 624.

"*Bones as Manure.*—The researches of the chemist and the practical testimony of the farmer having more fully established the value of bones as a manure, it behoves us to ascertain whether they have been employed in gardening as extensively as they deserve. The greatest obstacle to the more general use of bones in gardening, as well as in farming, is their undergoing decomposition so very slowly.—*M. Saul, Exotic Nursery, Chelsea.*" 1847, p. 639.

"*Vineries at Bishop's Stortford.*—The borders are ad-

mirably constructed. The houses are built on the side of a low hill, with a gravelly bottom. On the *surface* of the natural ground, which was coated with concrete, the border has been formed three and a half feet deep at the back, and two and a half feet deep in the front, so that it slopes from back to front, where it is rounded off. No rain can ever lodge there. It was formed with burnt clay, (the bottom of some old brick-kilns,) loamy turf from an old pasture, plasterer's rubbish, hair and trimmings of hides (called fleshings,) from the tan yards, and an enormous quantity of thoroughly rotten stable manure, —the last border alone consumed a barge load of forty tons of such manure. All these materials, after being thrown together, were *thoroughly* incorporated. They form so loose a bed that a stick may be easily pushed through it to the very bottom. Every November, these borders receive a good mulching of stable manure, which remains to rot in the succeeding summer; so that the surface is always covered by a rich decaying material which absorbs heat from the sun, and detains the natural dampness of the border. The vines are managed upon Mr. Crawshay's plan.

“These vines were planted in 1843, cut back in 1844, when each at once made the whole of the single rod that furnishes the crop. These rods are now, on an average, five and a half inches in circumference, and run straight up the center of each light, so that the leaves and bunches are exposed to all the light and air which the houses can furnish. The fruit produced by this practice is represented as being very fine, the bunches not remarkably large, but the berries are said to be beautiful, and the

fruit equally distributed on the vines throughout the house." 1847, p. 683.

"A. B. says: In forming a new border, I should recommend the soil to be excavated to the depth of three feet, not more, but the wider the border is, the better,—twenty feet is not too wide. There should be a drain in front, and the border should slope well to it. I would bottom with rough sandstone, or some material which would secure perfect drainage; and I would cover the latter with thin turf, or peat, to prevent it from being choked up. As compost, I would recommend one fourth old mortar, bones, and charcoal,—the bones and charcoal to be broken, but not too small; one fourth, decomposed tree leaves; and the remaining half, the top spit of a good old pasture, or common, which should have lain eighteen months in a heap, and frequently turned and exposed to the frost. The whole being well incorporated, fill in the border, taking care to tread as little as possible." 1847, p. 685.

"In our opinion, it is doubtful whether any material like slaughter-house manure is fit for vine borders. Its effect is to cause excessive growth, and, for a little while, large quantities of grapes; but the effect is transient, and plants suffer finally. It is much better to employ bones, hair, woolen rags, skin, tanners' fleshings, and similar substances. See Mr. Nash's border, Bishop's Stortford." 1847, p. 736.

Here the question naturally arises, What is slaughter-house manure? or, of what does it consist? It is to be presumed that this manure varies very much, in its component parts, in different countries, being affected by lo-

cal customs. What I meant by the substance, (and which I have used in my grape borders, and recommend as a substitute for the carcasses of animals, or bones,) consists mainly of the intestines, with the manures which were in the animals at the time they were killed, all the heads, horns, and feet of sheep, and a good share of bones, and other refuse of other animals. The half of the bulk and weight of the manures has been the heads, the lower half of the legs, and other bones, with some flesh, and skin, and hair, etc., upon a large part of them. Now all these articles are very powerful manures, and very lasting in their nature, and should not be placed in the border until decomposed in some measure, or, which is better, put at the bottom of the border, where the roots of the vine will find them the second or third year. A large part of the fleshy matter, in its decomposition, turns to a liquid, and the soil near by imbibes this, and is enriched thereby. These substances, when in this state of decomposition, if they come in contact with the roots of the vine, will instantly destroy the part touched, and this is why I place it at the bottom of the border, to be there for the future use of the vine, and out of the way of doing mischief. If this material is to be used as a top dressing, it should remain in the compost heap till it is entirely decomposed. I consider it, when placed as directed, at the bottom of the border, a most valuable material for the nourishment of the grape vine; but, if whole bones of animals can be obtained in sufficient quantities, I give them the preference; not that they are more valuable, but because the slaughter-house manure

is (let it be ever so fresh,) always an unpleasant and disagreeable object.

In countries (as I presume is the case in England,) where the heads and bones of animals are considered too valuable to be thrown into the manure heap at the shambles, the most lasting, and, for this purpose, the part constituting the properties for which it has been recommended are wanting, and it is of no more value than any other stimulating manure.

“As some difference of opinion exists respecting the proper covering for vine borders, I have ventured to give the material I use, which answers (under the circumstances,) as well as any thing I have seen recommended. At the first appearance of frost, I cover the border with dry beech or oak leaves, (two feet or more in thickness,) newly fallen from the trees if I can get them; cover with a little litter to keep them from blowing away. In spring, as soon as fine weather sets in, I remove the leaves entirely, fork the border over lightly, and add a nice top dressing of rotten manure mixed with the best soil I can procure.

“In making the border, I have followed Mr. Hoare’s plan, as far as possible. The foundation is flagged over with a deep drain running round the outside. I laid on the flags eighteen inches of broken bricks, lumps of old mortar, &c., with a little small on the top, in which I put a three inch sod (grassy side down,) to prevent the compost from getting down amongst the bricks. The principal part of the compost consisted of rich turfy loam, leaf mould, and rotten dung, with lime rubbish and gravel to



keep it open, and plenty of whole bones and a little carrion to make it durable.—*A Subscriber.*” 1847, p. 837.

*Renovation of Vine Borders.*—After stating that these must be legion, (if we may judge by the number of complaints,) which require this remedy, and that the cause mainly is stagnation, it is recommended to enlarge or renew the drains, which are supposed to be inefficient or improperly arranged, or to have become choked up by age. There is added: “Now even a border made of loam,—unless what is termed sandy loam,—if two or three feet in depth, would become in time too much closed up to suit the natural habits of the vine; how much more, then, a three-feet-deep border, in which decomposing organic matter constitutes nearly one half its volume! Every body knows that this black and fatty humus,—for such it becomes by age,—does not, in its own nature, contain sand sufficient to ensure at all times a speedy transmission of moisture, and to secure permeability to the atmosphere, especially if buried nearly a yard in depth.”

Here follow directions for introducing drains, and holes filled with open “rubbly matter,” &c., and then this advice: “After these things are accomplished, it would be well to fork in a dressing composed of lime rubbish, charcoal, coarse sand, bones, &c., on the surface, not going deeper than six inches, unless there are no roots in the way. Finally, the border may be coated over with three inches of manure from the stable door, if to spare. This, however, should only lie from November until midsummer; it might then be removed, and an inch or

two of old vegetable soil or decayed linings substituted in its room." 1847, p. 71.

*Vine Borders.*—By James Duncan, Basing Park, Alton. "I am now forming a border for the growth of this plant. I employ a two-horse cartload of dead lime rubbish, with which some brickbats are mixed, and a sack of half inch bones, (for each vine,) well incorporated with a loam of very thin turf, taken from an old common; the whole is covered over with six inches of road scrapings, with which some charcoal will be mixed when the vines are planted. The border, when finished, will be about two and a half feet in depth, and sixteen feet in width, resting on a substratum of flint stones, sloping from the house, and two feet in thickness, so as to afford effectual drainage; and this I consider a most essential point in the formation of vine borders." 1847, p. 205.

*Vine Borders.*—By Robert Greenfield, gardener, Tynemouth House, Northumberland. "The bottom of the border is chalk; on this is laid one foot of rubble stones, and, upon this, the compost of rotten turf from a common which has lain undisturbed for fifty years." 1847, p. 358.

"All vine borders, whether early or late, should be instantly covered a foot deep, if possible, with rotting manures; this will intercept the departure of the remaining ground heat, and will contribute much to the fertility of the vines in the ensuing year. Vines for early forcing, with outside roots, will soon be benefited by a slight amount of fermentation in the border covering." Oct. 20th, 1847, p. 720.

*Remarks on the Cultivation of the Vine.*—By James Hutchinson, Gardener at Cranston Hill, near Glasgow.

After some remarks relative to spur and other systems of pruning the vine, this writer goes on to recommend the long cane system as the best. As I have explained this plan fully and stated the objections to it, I shall not repeat here his remarks, but shall give what he says relative to the temperature of the house and border where the vines are to be forced. In my opinion, they are well worthy of careful attention.

“I commence forcing about the end of February, or beginning of March; previously to which, I cover the vine border, to the depth of ten or twelve inches, with horse dung of the best quality. Before this dung is laid on the border, it should be thrown up in a heap for two or three days, until it begins to heat properly. It should then be laid on the border without delay, as its powers will be greatly weakened by the process of fermentation. The temperature of the surface of the border will be raised, by means of this dung, to about 50° Fah., a point of great importance. It is evidently contrary to nature to be forcing the vines when the roots are exposed to cold, or, at least, deriving no warmth to stimulate the juices of the plants. I keep the temperature in the hot-house at about 50° in the morning, at first; and about 55° during the day, if dull weather. If the nights are very cold or frosty at the commencement of forcing, if the thermometer is 48° in the morning, I am satisfied. This heat is continued until the buds are all broken; after which, the thermometer may be allowed to range between 50° and 55° in the morning, and about 60° during

the day, if dull weather. In clear weather, from the commencement of forcing, I open the upper door of the furnace, merely keeping the fire in during the day, and allow the temperature to rise in the hothouse to  $70^{\circ}$ ,  $75^{\circ}$ , or even  $80^{\circ}$ . Were there a continuance of clear weather at this stage of forcing,  $80^{\circ}$  would be too high; but, for a day or two, it does not matter, although the thermometer should rise to  $80^{\circ}$  in the middle of the day. This temperature should be continued during the day, should the weather be clear, until the first leaves of the vine are fully expanded, when the temperature may be kept between  $85^{\circ}$  and  $90^{\circ}$  in the daytime in clear weather. When the vines are in flower, I keep the temperature between  $55^{\circ}$  and  $60^{\circ}$  in the morning, and between  $65^{\circ}$  and  $70^{\circ}$  during the day, if dull weather, and about  $85^{\circ}$  if sunshine. After the grapes are set, the thermometer may be allowed to rise to  $90^{\circ}$  or  $95^{\circ}$  during the day in clear weather. In dull or wet weather, in summer, instead of kindling fires at night in the ordinary way, I cause the flues to be heated in the morning in order to raise the mercury in the thermometer to about  $70^{\circ}$  during the day, and allow the fire to burn out towards night. The temperature in the daytime, from the commencement of forcing, should be regulated, in some measure, by the heat of the vinehouse during the night. For example, if the house has been colder during the night than I could wish, I keep up a greater heat than usual during the following day; and, if it has been warmer during the night than I consider requisite, I give less fire during the day than usual; or more air, according to the state of the weather.

“Many may object to the lowness of the temperature

that I have recommended during the night, when the grapes are in flower; but all the kinds cultivated here, including the Tokay, Black Hamburgh, White Sweetwater, &c., uniformly set well with the heat above mentioned. Indeed, when the nights have been frosty, during the time my vines were in flower, I have seen the thermometer as low as  $52^{\circ}$  in the morning, and I never observed that they sustained the least injury by this low temperature. Too much dependence has hitherto been placed on the influence of fire heat in the forcing of hot-houses. The great art is to do with as little fire heat as possible, and to take the utmost advantage of the heat derivable from the sun's rays, consistent with giving a sufficient quantity of air. The legitimate use of fire heat is to prevent the bad effects of frosts, snows, and inclement weather.

"I may now say a few words on giving air. In clear weather it should always be given early in the morning, and taken away early in the afternoon. For example, let a small portion of air be given between eight and nine o'clock in the morning, and, if the day continue clear, give more between ten and eleven, and take it all away at three o'clock. I seldom let air into my vine-houses after three o'clock in the afternoon. If air be admitted until the house is completely cooled, a large fire may be necessary to support the requisite temperature; and it is evident that sun heat is better and cheaper than fire heat."—*Sept.*, 1838.

By the foregoing, it would appear that the plan of covering the border with heating substances, for the purpose of raising the temperature of the border, was sug-

gested and practised before Mr. Roberts's book appeared.\* It differs from his plan in not recommending the continuance of this heat by renewing of the fermenting materials, which renewal, in my opinion, is necessary.

Mr. A. Forsyth, in a diary of the culture of the grape, published in Loudon's Magazine, vol. 10, page 548, also gives directions relative to the covering of the border, as follows:—

“Nov. 25th, 1833. Forked the border about three inches deep; laid on turfy loam and old lime mortar about two inches deep; then old hotbed dung, well rotted, two inches deep; the roots being near the surface, having been planted as shallow as possible. 27th. Laid leaves on the vine border one foot thick, and fresh hot dung one foot: protected the above from rains, &c. by reed covers, used at other times for pine pits. Dec. 1st. Fire heat applied. Jan. 5th, 1834. Heat of dung on the border,  $96^{\circ}$ . 19th. Heat of dung on the border,  $65^{\circ}$ . Feb. 1st. Dung on the border nearly cold. March 12th. Dung, leaves, &c. cleared off the border to admit sun heat, &c.; the border was forked over. April 12th. First berry of the Hamburgh beginning to change color; border watered with dung water, (dry weather.) May 10th. Grapes exhibited at the gardens of the London Horticultural Society, for which the large gold medal was awarded, the berries measuring three and a half and four inches round.”

I cannot agree with Mr. Hutchinson in the propriety

\* See Mr. Roberts's plan for heating the border, and remarks relative thereto.



of his giving fixed hours for opening and closing the lights for the purpose of giving air. These directions may be good for a certain house, and very unsuitable for another. They may be, and probably were, intended as applicable to a house with a front due south. Now, if the front should be to the southeast, the house thus situated would be exposed to a very great heat one or two hours before the time specified, and, in the months of May and June, the lights in bright weather would require to be opened much earlier. Again, if the fronting of the house inclines to the west, eight or nine o'clock would be, perhaps, too early. His principle, as applied to the forcing-house, is correct, but he errs in giving fixed hours for ventilating the house, when he should have substituted the range of the mercury as a guide. In this country, in May and frequently in the summer months, the mercury ranges in the daytime from  $75^{\circ}$  to  $90^{\circ}$  in the shade. At such times, how unsuitable for the welfare of the vines would be the closing of the windows of the grapery at an early hour!

*Culture of the Vine under Glass.*—By James Roberts. London, 1842.

This work is very concise, and, for the climate of England,\* unsurpassed in its directions for the preparation of the border, etc.; yet there are objections to it, particularly as concerns the cultivation in this country. It is divided into six short chapters. In the preface, Mr.

\* If we can judge from the result of the practice, as detailed by the author, whose statements, as regards the crop of fruit and its fine quality, are corroborated by the Gardeners' Chronicle.

Roberts states "that it has been his study to bring the vine into a bearing state earlier than what is commonly practised."

The first chapter treats of the border ; the opinion of the author upon the different composts as recommended by Speechly, Abercrombie, Mawe, and others, and his own plan upon the subject, which is as follows :—

"The borders outside the houses ought to be twenty-four feet wide, cleared out to the depth of three feet six inches upon a bottom of retentive clay, well prepared, with a fall of one foot from back to front. A main drain ought to run along the extremity of the border, one foot six inches deep, with cross drains, in an oblique direction, leading into it, so as to have perfect command in draining off superfluous water, which I consider an essential point to attend to, so as to lay them dry (more particularly where the climate is humid); I then laid upon the bottom thus formed, broken stones and lime rubbish to the depth of one foot, leaving a depth for compost of two feet six inches. Upon the broken stones, every six or eight feet square, I have placed large limestones, of the same nature as the far famed Skipton rock, which I have no doubt contribute to retain moisture in a dry season, and to facilitate the drainage in a wet one. The compost and manures I most recommend, and which I made use of, are, two parts the parings of a piece of old pasture land, a strong loam, laid up one year, (or till the sward is half decomposed,) in the form of a potato hod, close covered in with soil, and never turned ; one part, the turf with four inches of the soil, of a looser texture, laid up for the

same period, and not turned, as before; an eighth part, scrapings of the highways formed from limestone, or other hard material; and the other eighth part, half-decomposed horse or cow dung. I am not an advocate for turning over and mixing the materials promiscuously together, as, by often turning, the compost becomes too solid, losing a great portion of its fertilizing property by such repeated intermixture; and, unless it be of a very sandy, loose texture, the border will, in a few years, become impervious both to water and to atmospheric air, which are of incalculable benefit to the growth of the vine. I would recommend the autumn, if the weather be dry, to prepare to fill in your border. A month previous to filling your border, provide a quantity of carrion, cattle dying by accident, disease, &c., which, I am sorry to say, has, of late years, been too common an occurrence. If you have collected it sometime beforehand, have it cut into small pieces and laid up in soil, till the time of using. It emits a very nauseous effluvium, but this must be borne, for this is the *pabulum* to produce the nectar of Bacchus. When all is ready, and the weather favorable, proceed at one end of your border, wheeling in and mixing the materials in proportion as they stand to each other in my previous directions, on no account breaking the materials in mixing, but turn them in as rough as possible, adding one good-sized horse or cow carcass to every ten or twelve square yards, using caution, and not bringing it to the surface of the border within one foot, as its assistance is not wanted the first year. What I have here recommended, is my practice adopted at this place, the result of which, I dare pre-

sume to say, has surprised all, both gentlemen and practical gardeners, who have witnessed it."

Mr. Roberts then goes on to say: "Still, an improvement might be made on this border, particularly where a cool and humid atmosphere prevails, as it does, to a great extent, in the northern parts of these kingdoms.

"To obviate this defect, I should recommend, instead of a border two feet six inches deep, with one huge stone every six or eight feet square, to put four or five in the same space, allowing the border, when filled and settled, to be from fifteen to eighteen inches deep, and to plant the vines as near upon the surface as possible; you would then be better able to add a top dressing to your border every autumn, so as to feed and keep the roots of your vine near the surface."

The second chapter treats of the kind of grapes for the vinery, etc., and of the different methods of propagating the vine; his plan is by the single eye, as follows:—

"Choose bold, prominent buds, taking two inches of wood; on each side cut a little sloping, opposite the eye; then pot singly, in thirty-two sized pots, using leaf mould and sandy loam in equal parts," prepared fourteen days before placing in the pit. "When your pit is ready, having been filled with stable dung and tree leaves, so as to command a bottom heat of 80° or 85°, which you can easily ascertain by inserting a Fahrenheit's thermometer to the depth of a foot, proceed to plunge in your pots, which you may safely do, being rather sparing of water the first fortnight or three weeks, and never using the water at a lower tempera-

ture than the heat of the bed. The temperature of the pit must not exceed  $55^{\circ}$  by day, and may be allowed to fall to  $45^{\circ}$  in the night, until the buds are in motion. They will then require the raising of the heat gradually until it reaches  $55^{\circ}$  by night, by the time the first leaves are fully expanded; allowing them ten or fifteen degrees more by day, or sun heat, keeping a moist temperature, syringing, and shutting up early in the afternoon. By the time they have grown a foot, or eighteen inches, they will require removal to larger pots."

In the third chapter, the method of planting is detailed, etc. "For a vinery, some authors recommend inside planting, with which I don't agree, except for the back wall, or for a succession crop, intended to be trained below the rafters of the roof vines. Presuming your borders have been made and properly settled, as advised in a former part of this work, in the month of March or April, carefully turn your young vine out of the pot, taking its top through an opening in the sill left for its insertion, leaving two buds clear inside the house; this will leave the ball three or four feet from the front of the vinery. Open the soil opposite to each rafter. Then proceed to single out the roots with great care, spreading them out in the fan manner, filling in amongst them with the compost of leaf mould and sandy loam, keeping them as near the surface as possible, laying in the young cane forward to the wall, and not allowing it to be buried more than three inches. A little water would be of service, at the time of planting, in washing in the soil, to the benefit of the roots, mulching them over with a little litter. In the course of a week from the time of plant-

ing, lay on the surface of the border, over the roots and stems, stable litter and leaves in a good state of fermentation, to the width of eight feet, and two feet six inches thick, which will prove of great benefit to the young plant by putting its roots in motion, and cause that part of the stem that is *layered* to emit healthy roots in abundance, not employing artificial heat inside, but giving plenty of air, which still continue, until you perceive the buds in motion, allowing the house to rise to  $65^{\circ}$  or  $70^{\circ}$  by sun heat; syringing the buds and steaming the house, as the heat rises in the fore part of the day, closing early in the afternoon, and allowing the house to cool down, as night approaches, to  $48^{\circ}$  or  $50^{\circ}$ .

“When your shoots have sprung three or four inches, make choice of the best, and rub the other off. As the shoots elongate, tie them carefully to the wires, taking off all tendrils and laterals as they appear. I may be allowed to say, that the method of pruning I recommend, to bring a young vine into a permanent bearing state the soonest, is by single rod, on the spur principle. As the foliage becomes fully expanded, raise the temperature in the night gradually to  $60^{\circ}$ , as I consider  $60^{\circ}$  or  $65^{\circ}$  a sufficiently high night temperature for the young vine, in its first season of growth. The temperature in the day may be allowed to rise  $10^{\circ}$ ,  $20^{\circ}$ , or  $25^{\circ}$  higher, by solar heat, keeping up a very humid atmosphere. If the heat of the leaves and litter has begun to decline, work them up again with some good hot stable litter, covering the border two feet wider. If the heat at the root can be maintained at  $90^{\circ}$  or  $95^{\circ}$ , your prospects will be the more cheering, as, by keeping a low temperature in the



house through the night, the roots of your vines, at that season, will be in active work, preparing and gathering food for the following day.

“As the season advances, your vines will be fast approaching maturity ; keep your house less humid than before. If the weather proves open and warm, you may reduce the manure at the root, taking away the whole as your vine ripens towards the extremity, as it will have performed its good offices to your satisfaction ; but you had better leave two or three inches of the shortest dung, or else lay on a few decomposed leaves, as you will perceive the heat of the dung will have kept and encouraged the roots, on and near the surface of the border. By the time the wood has attained a good brown russet color at the extremity, you may prepare them for next year, as they will bear pruning, though the leaves may not drop for weeks, any time without danger.

“My practice is, to disbud the cane as soon as the wood is ripe. You may proceed thus : beginning at the bottom of the vine, leaving a bud you think is well placed and on the side of the shoot, then cut clean out the two following, leaving the fourth, taking out the next two, and so on till you reach eight or nine feet in height, as to that length the cane must be cut back ; proceed again at the bottom, disbudding the other side in the same manner, so that, in that length, you will be able to leave eight or ten permanent eyes, to form fruit-bearing spurs for the following year, or five on each side. Having cleared your border of the superfluous manure, which will be the case by the beginning of July, during that month and August I keep my border nearly exposed

to the full rays of the sun and air, by which means the majority of the roots having been kept on the surface, by the heat added as before mentioned, are more perfectly ripened, so that in September I am enabled to give them a light top dressing (though only the first season,) of ground bones, loamy soil, rotten manure, and decayed carrion,—these manures are all, I have proved, great fertilizers of the vine,—covering the whole with an inch or two of half rotten stable manure, to prevent evaporation.

“The vines planted on the inside of the house will require attention at the root; they want great support as their foliage becomes fully developed. I make use of liquid manure diluted, and clear rainwater, alternately, but always in a tepid state. I never allow a vine border inside the house to be watered with cold water after vegetation commences, until the fruit or wood is ripe.”

Chapter 4th. “Presuming that all has gone on favorably the last season, you may expect a nice sprinkling of grapes from your young vines only planted one year; but I caution the tyro not to be anxious in wishing to produce very early grapes; if too sanguine, he will do this at the expense, and to the great detriment, of the future welfare of his young vines. The first, or middle of March, I consider sufficiently soon to begin forcing, the second year. A few days previous to commencing, lay on the border, to the width of twelve or fourteen feet, good fermenting stable litter and leaves, to the depth as mentioned for last season. The time your vines will take to break will be a fortnight or three weeks. (Previous to forcing, the vines must be washed with a composition

of soap, sulphur, etc.) I generally keep my vines tied horizontally along the front until every bud is in motion. Keep a low temperature in the night, say  $45^{\circ}$ , till you perceive them all moving;  $15^{\circ}$  or  $20^{\circ}$  higher in the day will do no harm, by sun heat, syringing them morning, noon, and night, and keeping a very humid atmosphere. When the buds are fully broken, tie them up to the roof; you may raise the temperature gradually in the night, up to their time of showing fruit,  $8^{\circ}$  or  $10^{\circ}$ ; the same by day, observing to keep up a very humid atmosphere. Syringe lightly, and close your house early in the afternoon. Your vines will now be showing three or four bunches at every eye left at winter-pruning; by no means leave more than one bunch on each shoot, and one on the leading shoot. My practice is to stop the shoot on the spurs at one eye beyond the bunch, taking off all laterals and tendrils as they appear. The leading shoot must be kept neatly tied up, divesting it of laterals, &c., as for last season, until it reaches the top of the house; you may then stop it, leaving a lateral or two to keep it in check, as well as on each spur, if danger is to be apprehended from the breaking of the natural buds. As they approach the time of blooming, raise the night temperature gradually to  $65^{\circ}$  or  $68^{\circ}$ , increasing the day temperature in the same ratio, keeping the house, when the vines are in bloom, rather dry." After the grapes have set, and are thinned, the temperature of the house is to be, at night, "say  $65^{\circ}$ ; and  $85^{\circ}$ ,  $90^{\circ}$ , or  $95^{\circ}$  in the day, with a very humid atmosphere.

"If cloudy, cool weather should intervene, keep up a brisk heat, by stirring well your fires early in the morn

ing, and, up to midday, keeping up to  $80^{\circ}$ , or  $85^{\circ}$  with a very humid atmosphere, allowing your fires, or boilers, to cool down in the after part of the day ; it is my practice to give heat with light, and to reduce it with approaching darkness. A vine, after vegetation is commenced until the fruit is ripe, should never receive any check. We will presume by this time, the grapes are stoned, and changing color. Again examine your outside border ; if the heat has much declined, take part away, adding more fresh in its place, working all well up together to cause a brisk heat, which should be kept up till your grapes are nearly colored ; by keeping the roots in a somewhat corresponding temperature with that to which the top is exposed, shanking and shrivelling have been discarded, and the effect produced noble specimens of grapes without a shanked berry upon them, no matter whether a wet or a dry season. After the fruit has done swelling, you may remove the dung by degrees from the roots, and discontinue the humidity of the house, keeping up a brisk heat with plenty of air, so as to color the fruit more perfectly, after which time you may lower the house by degrees, keeping it cool and dry.

“If, by this time, your wood appears ripe, though the leaves may not have changed color, you may disbud your leading shoot, as mentioned for last pruning season, shortening it so as the joint of two years' growth may reach fifteen or sixteen feet ; likewise, as the fruit is cleared, you may prune your spurs, cutting them into two eyes. Give your border a top dressing, and in all

other respects follow what was recommended for the previous autumn."

Chapter 5th. "As the season approaches to start your young vines, with their wood the growth of two years, many would object to letting them carry a heavy crop of fruit, but content themselves with a light sprinkling, knowing it to be so adverse to the old-received practice of managing young vines, and that prejudice having taken deep root for years in only a moderate soil, is bad to eradicate. However, it has been my intention in these pages to point out the errors, and improve upon the practice, of by-gone times, and I have been able to show by experience that every success will attend grape-growers, if the foregoing instructions be implicitly followed, and that they will have the pleasure of seeing, from vines the growth of two years, a noble crop of fruit, free from shanking or shrivelling, (as has been frequently witnessed at this place, by many gentlemen, gardeners and amateurs,) what is not commonly seen till the fourth or fifth year after planting. Presuming your vines were turned out last autumn,\* your border renovated, &c., the middle of February will be soon enough to start your young canes this season, as it would be very injurious to them to carry a heavy crop of fruit, and be started very early. Use caution, begin steadily, and you will be better able to succeed permanently, and may, in succeeding years, begin a few weeks earlier each year, by practising which, you will bring them steadily into a proper state, by degrees, for early forcing.

\* This can never be done to advantage in our northern States.

“Proceed as before advised, and lay on, to the depth of two feet or two feet six inches, and four feet wider than you think the extremity of the root reaches, of hot stable manure and collected leaves; the leaves will assist the manure in giving out a more steady heat, and not so likely to vary with the weather, and, if thatched with straw or covered with any other light material, would retain its heat much longer. Let the temperature at night be kept low, say  $45^{\circ}$  or  $48^{\circ}$ ; it may range in the day  $15^{\circ}$ ,  $20^{\circ}$ , or  $25^{\circ}$  higher by sun heat, with air, syringing the canes with tepid water three or four times in the day, maintaining a very humid atmosphere, by throwing water on the pipes or flues, and sprinkling the pathways. I caution to work steady, so as to break the whole of the eyes upon the young wood, (there will be no doubt of the spurs,) for, bear in mind, you, at winter pruning, left no more eyes than you absolutely wanted; therefore, proceed cautiously,—you cannot afford to leave one unbroken; if that were the case, they might break the next season, but they would leave an unsightly and perceptible gap the whole of this year. If all has gone on well, in the course of three weeks or a month, your buds will be in motion, and, as soon as you fairly perceive that, sling them up to the wires, two feet from the glass, raising the extremity of the lead within one foot; it will cause the lower buds to break more boldly: lower the lead as you see occasion. I generally let the vines remain in that position until all the side shoots are stopped, out of bloom, and want thinning, especially the first house, as, by that time, there is no danger to be apprehended from the frost. Up to the time the grapes are



commencing to bloom, keep up a very humid temperature by day, gradually raising the night temperature to  $65^{\circ}$  or  $68^{\circ}$  at the time of blooming, raising the day temperature in proportion. I always keep the house humid and close from the time the buds have sprung two or three inches until they are changing color; (when in bloom they will require to be kept dryer.) I never give air, after the shoots are stopped, up to the fruit changing color, till the thermometer attains  $80^{\circ}$ , and this being a humid and cold climate, in dull weather I have the boilers worked in the fore part of the day, letting them cool down in the afternoon, so that I use little or no fire in the night; but, as I said before, give heat with light, and allow the house to get cool with darkness, the very reverse of the old practice in forcing the vine.

“As your fruit proceeds in swelling, keep the night temperature to the point as stated for blooming, until the berries are stoned; you may then raise a few degrees, but at no period do I exceed  $70^{\circ}$  in the night. They will now swell apace; take off all laterals, keeping the house very humid; you may allow the temperature to rise, by sun heat, to  $90^{\circ}$ ,  $95^{\circ}$ , or  $100^{\circ}$ , or even higher, so that you keep a very moist atmosphere. Examine your border when the fruit is stoned; if the heat has greatly declined, add more fermenting material, for upon this, in an equal degree as on the temperature of the house, depends the success of noble swelled fruit. Your vines, if any are planted on the back wall, or otherwise inside the house, must have every attention paid them as to moisture at the root, summer pruning, and, in other respects, be treated as the roof vines. When the foliage is fully

expanded and the fruit is swelling, they will require water at the root twice or three times a week, given in such quantities as reason may suggest, using it in a warm state along with the drainage of the dunghill. If all has gone on well, the berries will soon begin to change color; be cautious they do not receive a check, to avoid which, keep up the heat and moisture in the day. As the grapes approach ripeness, suspend, by degrees, the humidity of the house, keeping up a brisk heat and giving plenty of air. Examine the heat at the roots at the time the grapes are changing color; if it has begun to decline, renovate it, keeping up a heat at the roots as high or higher than the temperature inside the house. You will see the benefit from this, in the grapes swelling to an uncommon size, with no fear of that pest, shanking and shrivelling. After your grapes are ripe, lower the heat of your house by degrees, keeping it cool and dry, removing the dung from the roots, as recommended in previous parts of this work.

“On the coloring of grapes, we often hear it remarked that, though perfectly ripe, many are not well colored, black grapes more than white; the loss of color in my opinion, is by an over-abundant crop. By the old method of forcing the vine, it is the general practice in June to put out the fires, and to use little or none until September or October; the change may happen at the time the fruit is changing color; the house is then lowered in temperature, and kept cool and dry; by such practice, black grapes will attain a good color, (if a light or moderate crop,) subject to shanking, and at the expense of size; and black Hamburgs no more answer to

their name, as regards the shape of the berry, than a Black Prince resembles a Black Damascus ; you will always find that they are small finger, or oval-shaped, whereas, grown by the practice I recommend, they are large, and nearly globular. It is quite practicable to grow fine, noble swelled fruit, and colored to perfection, to be certain of which, you must not allow the vines to carry too heavy a crop, keeping the temperature as recommended in all their stages of growth through this work. In giving an opinion on the defect in the coloring of grapes, it is not given as the sole cause, for, at the time I am now writing, I have Hamburgh, Muscat, and other vines, carrying forty, fifty, and even sixty pounds weight of noble and good colored fruit, and have never had a shanked berry on them, though the vines were only planted three years in April last.

“Pruning. It is my intention, in laying my practice before the public, to show that single rod and spur-pruning, in preference to long rod, will bring a vine the soonest to bear a permanent crop of fruit. We will presume your vines ready for the pruning knife ; the foliage having shown indications of dropping, you may cut back your lead to within one foot of the top of the house, it will give you a little more cane ; having disbudded it some time ago, you will have only left two eyes for spurs, and the leading one proceed to prune downwards on the vine, pruning your spurs to two, three, or four eyes, choosing a bold, prominent eye or bud, (many may say they look unsightly, but you will be repaid with noble bunches on that head,) leaving the uppermost eye for fruit, cutting clean out the others with the exception

of the one at the base, which is to be retained, but on no account to bear fruit, as it is intended to prune back to it the following year, so as to bring the spur nearer home. I must not omit to mention, that I have generally my bud singled out on each spur at the time I recommend for disbudding the lead, that is, taking off every bud above and below, (not injuring the leaf,) with the exception of the one intended to bear fruit, and the one above mentioned for wood, the following year. As soon as the wounds are healed after pruning, cover every cut you have made with a little mild paint.

“You will have removed the dung from the roots at the time mentioned for last season. You will bear in mind the renovation of the border, and the protection, if required, from frost.”

Chapter 6th. “Presuming the season is again approaching for the development of your young vines, provided you started them the latter end of February, last year, and you wish to have early fruit, you may begin three weeks or a month earlier, but by no means sooner, as it will be found the most conducive to their health and fruitfulness not to break in upon their habits too rashly. I cannot give, at present, (though I have some experiments in course of trial,) better instructions for the management of this and succeeding years, than by following out the comprehensive culture the whole of the season as plainly laid down in the foregoing pages, urging the necessity of carrying out the whole practice as therein stated, by close attention to which, success will certainly follow.

“Conclusion. In this attempt to lay down my prac-

tice in as clear and plain a light as I am able, I hope I shall be excused the repetitions, almost unavoidable, on such a subject. It will be found in plain language and plain practice, (pirated from no one,) from which I have had great success. I am aware that, in presenting these hints to the public, I expose myself either to the smile or the frown of the critic; whether he be lenient or severe, I must bear with patience the part allotted me, and only hope this work may be useful to some of my readers."

This is the plan as practised by Mr. Roberts; the rest of the book consists of the author's views upon the different systems of pruning, thinning, and of propagating the vine, with remarks upon the border as formerly made. A description of several kinds of grapes, for early forcing and other purposes, is added, and his own system praised and recommended as superior to any other.

*Remarks relating to Mr. Roberts's System.*—From what experience I have had in fruiting the vine, it is my opinion that the plant is weakened and permanently injured by allowing it to bear fruit thus early. To show how this can be done, however, is one of Mr. Roberts's objects in writing his book; there is no difficulty, where the border has been properly prepared, in fruiting vines the second season after planting; but is it advisable so to do? My own plan is not to fruit them till the third, and this, and the following years, suffering but a moderate number of bunches to remain on the vine; by this plan, and by judicious thinning of the berries, the plant will be gaining strength yearly, and, if capable of producing more fruit than the limited crop you have left to

mature, the bunches and berries will swell accordingly, and the weight of the grapes obtained will be increased in proportion to the strength of the vine, and the fruit of the colored kinds will be as black as possible, and the flavor rich, vinous, and delicious, in striking contrast to that from a plant which has been taxed to its utmost in its efforts to ripen an over-abundant crop.

A plant of the Esperione variety of the grape, obtained from Messrs. Hovey & Co. in the summer of 1843, grown from a single eye that same spring, and planted out when grown three or four inches only, made a remarkable growth; had it been allowed, and had there been in the grapery room to have permitted it to have grown, I do not doubt the entire length of the cane would have been fifty feet; it was stopped at about thirteen feet early in August, and several times cut back after this, during this month and September, which caused the eyes on the upper part of the cane to break; these produced very large bunches of fruit-buds, which were cut away in pruning; a second crop of fruit-buds appeared on new shoots, which were also cut away, and, when the foliage was destroyed, the last of October, by frost, a third crop was on the vines, which had been allowed to remain, and the berries of which were of sufficient size to thin.

In this case we have an instance of a vine which, in seven months from an eye, would have ripened fruit, had it been allowed. There was no artificial heating of the border, and no uncommon care bestowed upon the preparation of it. The soil used was one-half loam from the garden, from the spot where the border was



made, which had been well manured for several years, the other half was coarse manure from a barn-yard, where horses and oxen were kept; all the litter, and pieces of cornstalks, (Indian corn,) were mixed with it, and it was considered very coarse for the purpose; the depth of the soil was about eighteen inches, and the bottom covered with rocks, as the situation was a wet one.

I have frequently suffered vines of the Black Hamburg, White and Grizzly Frontignan, Zinfindal, and other sorts, to bear fruit the second year from the eye, and have exhibited bunches of the last named variety at the rooms of the Massachusetts Horticultural Society, thus grown, which have weighed between two and three pounds. Vines from Europe, after growing one season only, have also been fruited, when it has been particularly desired to prove the correctness of the plant. But, in almost every instance, the vines have been injured by it; the imported ones the most so.

The border he recommends, should be prepared in a different manner from that advised by myself. But it must be remembered, that, although we have more rain in this country than they have in England, yet the wet, cloudy, and foggy weather there is very much greater than in the United States of America; (the foggy weather in the province of New Brunswick undoubtedly approaches that of England more nearly). Therefore, is of questionable utility, the plan of main and cross drains. In America, the proportion of bright sunshiny days is much greater, also, than in England, producing

severe droughts ;\* and, as the vine cannot succeed in producing superior fruit without a proper supply of moisture, it is advisable to resort to some other method of avoiding too much wet. This can be done by using in the border a due proportion of broken bricks, oyster or any other shells, old mortar and small stones, fine charcoal, etc. ; all these articles have a tendency to keep the soil open, and to cause the water, when superabundant, to pass off ; they also are porous and retentive, and very

\* In Loudon's Magazine, page 303, for the year 1833, is a horticultural diary. By this it appears that, at the place of record in England, the weather of that year was 152 fine clear days, 83 cloudy, and 130 when it rained or snowed some part of the day.

At Salem, the average of three years is, 219 fine clear days, 66 cloudy, 80 rainy or snowy, showing the difference, in the United States, of 66 days more of sunshine, 50 days less rainy or snowy, and 17 days less of cloudy weather.

Notwithstanding this difference in the weather, the average quantity of rain which annually falls is greater in the United States than in England ; there, the mean average is  $31\frac{1}{2}$  inches ; in Salem, Mass., United States, 39 inches.

The time of the year in which the grape is usually ripening, under glass structures, embraces seven months, say from March to November ; during this period, in 1845, there fell, at Salem, 24 61-100 inches : in 1846, 16 97-100 inches ; in 1847, 27 49-100 inches. In the month of September, 1847, there fell  $6\frac{1}{4}$  inches, the greatest quantity in any month ; and the effect upon the grapes was bad, a large part of them suffering from the rot.

In England, there fell, during "1845, 23 33-100 inches ; in 1846, 27 71-100 inches ; in 1847, 16 25-100 inches, the smallest quantity that has fallen in any year since the present century."—*Gardeners' Chronicle*, 1848, p. 24.

A great difference is here shown in the year 1847. In seven months of that year in Salem, there fell 27 49-100 inches, when, in the whole year, but 16 25-100 fell in England.

The extreme range of the mercury, by a Fahrenheit thermometer, for 33 years, in Salem, Mass., latitude  $42^{\circ} 34'$ , north, longitude  $70^{\circ} 54'$ , west, was, in summer,  $101^{\circ}$  ; in winter,  $13^{\circ}$  below zero. In Philadelphia, latitude  $39^{\circ} 57'$ , longitude  $75^{\circ} 11'$ , in summer,  $103^{\circ}$  ; in winter,  $7^{\circ}$  below zero.

serviceable in yielding to the vine, in a season of drought, the desired moisture. These articles should be incorporated with the soil of the border; not (as advised by this gentleman,) laid in a mass of one foot depth at the bottom. The material in the compost of the soil for the border is unexceptionable, and the manner of preparing it, with the exception of carcasses of animals, which should be obtained at the time of preparing the border; or, whole bones substituted for them. Slaughter-house manure may be used instead of both of these articles, when it can be had of a suitable quality, that is, when it consists mainly of the offal of the slaughter-house, sheep's heads, hoofs, &c., with a good proportion of bones.

The system of growing the plants from single eyes, and the manner of planting them in the border, is the common method as practised by gardeners generally, at the present time.

Soon after planting the vines commences the operation of heating the border by manure piled over the roots. This is relied upon by Mr. Roberts as the *great good*. The necessity for this artificial heat does not exist in the summer months in the United States, nor in the southern states at any season. A great objection to it is the excessive stimulus to the plant from such a quantity of manure, which must be kept up every year, (after the vine has become accustomed to it,) or the plant will languish and cease to yield its fruit. In England, it unquestionably has, thus far, worked well; but, by this plan of heating the border, the roots are spreading with rapidity, and it seems inevitable that the time must come, when

the roots have so extended themselves, that they will suffer for the want of further protection.

Where grapes are grown under glass on an extensive scale, it would be difficult to obtain fresh stable manure in sufficient quantities (in most parts of our country it would be impossible,) to make it practicable, and the expense of so doing would be more than the value of the crop would warrant. In the vicinity of large cities, and occasionally in other localities, this manure may be obtained cheaply, and in sufficient quantities for the purpose; where this is the case, the objection to it, on the score of expense, is obviated.

A grapery one hundred feet long would require a border one hundred and ten feet in length and twenty-four feet wide. As, by Mr. Roberts's plan, the border is to be covered with this heating manure and leaves *four feet beyond* where the roots of the vine extend, and two and a half feet deep, in a few years, or as soon as the vines have become established, it follows, that the enormous quantity of  $65\frac{62}{100}$  cords of manure would be required, to cover in this manner, the border where the roots are now presumed to have extended themselves; thus, one hundred and twenty feet long, twenty-eight feet wide, and two and a half feet deep.

In our cold winter, I found it necessary to renew the heat by adding one fourth part of the new manure, and working it in with the old, every three or four weeks. On a border to a house winter-forced, that is, where forcing commences in December, this quantity of manure would be doubled by the renewals. It is true that you would have about half the original bulk of the manure

in the summer for other uses, but much of the strength of it will have escaped by evaporation, or have been washed into the earth ; and where labor is so high as it is with us, the cost of working and making this heat, and removing it after the fruit has ripened, will be very nearly equal to its value.

The cost of this manure at Salem, Mass., is \$4.50 the cord ; the expense of carting, from 50 cents to \$1.00 per cord, according to the distance it has to be carried ; making the whole cost of the quantity required as above, in round numbers, \$700.

On the rafters of a house of this length of border, which is to be winter-forced, eight hundred pounds of grapes would be a VERY LARGE AVERAGE CROP. On the back wall of the house, but 800 pounds. which would not be affected by this heat 267 on the border, one third of this quantity — would be as much as could be relied upon, 1067 pounds. and this is more than is usually produced in most graperies ; but my experience warrants me in placing it at about this amount.

To judge of the practicability of the plan, a short calculation will be necessary :—

Cost of manure for the border, . . . .	\$700 00
Interest* on the forcing-house, at a cost of \$15 the running foot, 100 feet, cost \$1500, at six per cent., . . . .	90 00
Annual breakage of glass and other wear, furnaces, &c., 4, . . . . .	60 00
Cost of fuel, . . . . .	70 00
Labor on fires, watering, manuring, trim- ming, and thinning grapes, . . . .	200 00
<hr/>	
Whole cost of the crop of grapes, . . . .	\$1120 00

The value of the crop of grapes, 1067 pounds, would not net the producer more than the cost, and the probability is, that there would be a loss to him. A very few pounds of grapes are sold in Boston, in April, at \$2 the pound, and in May, at \$1.50 to \$2; but the main part of the crop would not sell at over \$1 to \$1.25. The cost of sending the fruit to market, and the expense of selling, is from twenty-five to thirty per cent. In England, the prices are so much higher that this process can be resorted to with reason.†

\* The cost of a winter forcing-house is much greater, by necessity, in a very cold climate than that of a house which only requires a slight artificial heat in spring. The extra heating apparatus alone is a great additional cost.

† To show the relative prices of grapes and forced fruits in the two countries, I here add a memorandum, from Loudon's Magazine, of prices at Covent Garden Market, vol. for 1834, April, page 191: hothouse grapes, per pound, from £1 10s. to £1 15s. Grapes are spoken of as being remarkably early, 28th of March.

Vol. for 1835, April, page 270, grapes are quoted at from £1 to £1 4s.



I have found the plan of covering the border with litter (as directed in my remarks on forcing,) to answer every purpose, and at a much less expense.

I have a small stove or winter-forcing house, where the border is covered with movable glass, which is taken off as soon as the grapes are ripe, or the weather becomes warm in spring; the border, under this, is covered with six or eight inches of coarse litter and leaves in autumn, and, on the outside, with the same materials, so as, in all, to cover about twenty feet. This answers the purpose

and forced cherries at £1 10s. per pound, and forced strawberries, per ounce, 6d. to 1s. 3d.

Vol. for 1836, March, page 219, forced strawberries are quoted at from 2s. 6d. to 3s. 6d. per ounce, and hothouse grapes at £1 10s. per pound.

The same year, in April, page 272, strawberries are quoted at from 1s. to 2s. per ounce, and grapes at from 10s. to £1 per pound.

In May, page 328, strawberries were the same price, and grapes at from 6s. to 12s. per pound; nectarines and peaches at from £2 2s. to £3 3s. per dozen; cherries, per pound, from £1 to £1 10s.

In June, page 383, grapes were quoted at from 4s. to 8s. per pound; peaches and nectarines at from 15s. to £1 4s. per doz.; and cherries at from 4s. to 8s. per pound.

In August, page 498, hothouse grapes are quoted as at 3s. to 5s. per pound. The highest price for hothouse grapes is in March, and by this standard, and in our currency, this is \$8.47 per pound, and the value is constantly lessening till September. In August, they are at from 72 cents to \$1.21 per pound.

At Boston, in March, they sell at \$2 the pound, and this price is gradually falling until August and September, when they can be bought at 33 cents to 62 cents per pound. Forced peaches, nectarines, cherries, and strawberries, are at the same relative prices as grapes; and, indeed, neither of these last-named fruits can be grown for market in this country, under glass, to yield the cost of production, at the prices customarily paid for them.

The Gardeners' Chronicle for this year, 1848, quotes them at lower prices, \$3 per pound being the highest mentioned. In Boston, in July, this year they have been sold by the quantity as low as 50 cents, which is less than the cost

very well, but in no way better than the plan alluded to above.

On this border and under this glass covering I tried this system of hot manure in 1843. The only advantage I derived from it was the ripening of the fruit a few days earlier than usual. But the steam from the manure, when freshly made up, forced itself through the front of the house, by the sides of the sashes, &c., and destroyed the foliage of the vines, where it came immediately in contact with them. It is true that this would not have happened had the border not been covered. But the cost was more than the value of the crop, and the system has not been tried since for the purpose of forcing.

In the summer of 1843, I built a grapery. The border was made according to the plan given by me in the first part of this work. It was not begun till August, and the vines were planted the last of that month, and a few of them in September. They were of different ages, some only two and three months from the eye, and others one and two years old; they all came into fruit at the same time, and I never have been able to notice any difference in their growth, or in their produce, since the first year. As these vines were planted at so late a period, I was fearful that they might not become sufficiently established in their new situation to survive the winter. To induce a rapid and promote a late growth, this method of heat upon the border was resorted to, and with the desired effect generally. Owing to the situation of the grapery, which is on a gentle slope, a few of the vines at the bottom of this were killed by the too power

ful juices of the manure, which, after a heavy rain, soaked down to them. A second and third set were planted and killed also, and it was only by removing the manure that I was able to make vines grow there.

The plan has been abandoned by me as unsuitable for, and unnecessary in, this country. In some situations, where the ground is very cold and wet, and it is particularly desired to grow grapes without regard to the expense, then it may be found advantageous.

The disbudding of the cane is not advisable; in England, it may be serviceable on account of admitting light into the grapery; by Mr. Roberts's plan, a vine is never to have but twenty-one or twenty-three spurs. I prefer to have forty spurs, and, if the fruit is cut away from half of them, so much the better, for they can then be fruited alternately.

It will be noticed, that it is recommended never to give air in the middle stages of forcing until the thermometer attains eighty degrees; this is not my practice. In our climate, I would much prefer to give air gradually by opening the lights, or ventilators, a little, as soon as the mercury begins to rise from the influence of the sun's rays, and give more air as the day advances, having the greatest heat from 10 o'clock, A.M., to 2 o'clock, P.M.; the same rule to regulate the closing of the windows in the after part of the day.

The general remarks, as regards the heat from artificial means and the temperature of the house by night and day, are perfectly correct, and the advice given as to forcing, and the care requisite to prevent a check, are well worthy careful attention. It will be necessary to

make due allowance for difference of climate, if it is intended to follow out his plan entirely. For instance, he states that it has formerly been the practice to put out the fires in June in the grapery, even if the grapes were not ripe, and attributes to this cause some of the evils to which this fruit is subject under glass, and disapproves of this management, and goes on to say that the fires must be kept up until the fruit is ripe. It would be absurd, in this climate, to follow, literally, this advice; sometimes in May, and frequently in June, we have very warm weather, the mercury rising to  $80^{\circ}$ , and sometimes to  $90^{\circ}$  in the open air; at these times, the heat of the grapery cannot be kept under  $100^{\circ}$  while the sun is shining upon the house, and any heat in the flue, or boiler and pipes, would increase the difficulty. The fact is, such advice will not do; you must regulate the heat by the thermometer, and, in warm weather, at this season of the year, make, or omit to make, the fires, as the temperature of the external air may be.

Mr. Roberts says, "that shanking and shrivelling have been discarded by his plan of keeping the roots of the vine in a somewhat corresponding temperature with that to which the top is exposed." It has occurred to me, that the great excitement given to the roots of the vine, by the manure heaped upon them, and consequent vigor of the vine, may have been the cause of the fruit not shanking or shrivelling.

Mr. Roberts's idea may be the correct one, and yet shanking and shrivelling be avoided without using this method. If it is true, as Mr. R. states, that this difficulty is caused by too low a temperature at the roots of

the vine, as compared with that in which the tops are situated, may not this be avoided by having a lower temperature in the grapery, particularly in the night? I have, for many years, thought that this evil was often caused by too great heat, followed by too low a temperature. I can, at any time, cause these troubles in the forcing-house to appear, but am not always able to avoid them. A grapery without artificial heat is more subject to shanking than the forcing-house, notwithstanding the temperature of the earth, at the season of the year when such a house is liable to the attacks of this disease, is much higher, and the roots of the vine are enjoying a temperature relatively to the tops almost correspondent with vines in open culture.

I have observed that, in a house where there was no means of warming it by fires, the crop of fruit has suffered most when, after a continuance of hot, bright, and dry weather, in August, or early in September, we have had a succession of cold, dark, and rainy days. In this case, the cause is, apparently, too low a temperature at the top of the plant, causing stagnation of the sap. A brisk heat from a flue, or any other artificial means that will give a free circulation to the air throughout the house, and raise it to a temperature near which it has been during the hot weather, will prevent its spread. The cold rain will have reduced the temperature at the roots of the vine, but in a much less degree than that to which the tops have been exposed, so that now the tops are relatively to the roots in a proportionately cooler atmosphere than during the hot weather. It does not ap-

pear to me, that want of warmth at the root of the vine is the cause of the difficulty.

These varieties of the foreign grapes which, in the grapery, are now so much affected by this change in the weather, when in the open air, and growing in the same soil, do not suffer in the least from this shanking. It therefore appears evident, that the cause of the difficulty must be looked for in the temperature and ventilation of the grapery. And these causes are, in my opinion, too great and sudden changes in the temperature, and, perhaps, too great heat at night relatively to the day.

A low temperature at night is not injurious to the vine,\* on the contrary, it is probably beneficial. But the vine under glass, when the sun is shining, is subject to great heat, which rapidly accumulates, and, on the obscuration of the sun's rays, as rapidly decreases. Here is the cause of the trouble: vines in the open air do not suffer from this pent up accumulation of heat, and are not excessively excited thereby, and, when cool, cloudy weather follows a warm, bright season, they are not checked in the flow of the sap, as the vine is, under

\* In 1836, when visiting the vineyards near the Rhine, and on the border of the Lakes of Neufchatel and Geneva, I found the weather very cool, as compared with the temperature of that season of the year in Massachusetts, the thermometer, during August and September, varying from 46°, the lowest point at night, to 60°, and by day, the highest point being 76° in the shade. Notwithstanding the low point at which the mercury fell during the night, the grapes ripened finely. The vines here, though subject to an intense heat when the sun shone upon the vineyards upon the side of the hills, were, nevertheless, in an atmosphere which did not vary more than 10° or 15° in the daytime, excepting when the sun was shining upon them, and, being in the open air, there was no confined heat there.



glass, in a cold grapery, which is now suffering from a change in the temperature of  $40^{\circ}$  in the daytime, and  $10^{\circ}$  or  $15^{\circ}$  in the night.

The Catawba grape, a native variety, is so subject to shanking under glass, that, were it desirable to cultivate it there, it would not be practicable.

If the grapery, though not intended to be forced, is provided with a furnace and flue, or the Polmaise system of heating is introduced into the house, to be used when occasion may require it, (and there is nothing to be apprehended from this evil excepting when the grapes are changing color and taking their last swell,) there will be no danger of any serious loss of fruit, provided every other care is given to the house and crop as directed. But where the house is not provided with the means of artificial heat, promoting a free circulation of air in bright days, by throwing open freely the doors and windows, and keeping as low a temperature as possible in warm weather, is the safest mode of procedure. The desire to ripen the fruit early, causes the house to be kept warmer than prudence dictates. In our climate, we are not always subject to this pest; when the month of September is dry and clear, we escape altogether.

Every conceivable reason has been assigned as the cause of shanking and shrivelling of grapes, by different gardeners, and as frequently a certain remedy has been recommended; still, the evil exists. The term *shanking* is used when the stem of the bunch is affected, and *shrivelling* when only the footstalk of the berries is attacked. As this is the worst enemy the cultivator of this fruit has to contend with, I shall, in their own words, give the

opinions of some practical people, extracted principally from Loudon's Magazine :—

Vol. 10, page 19, a writer thinks it caused by too great heat at night.

Page 267, an experienced grape-grower thinks it caused by damp, and recommends a good fire in the daytime, and to give abundance of air, to expel it, by which means the moisture evaporated is carried off.

Page 137. Mr. J. D. Parkes, F. H. S., Nurseryman, Dartford. "A variety of causes have been assigned for that disease in forced grapes which produces a shrivelled appearance in the footstalks of the bunches, more especially in the Frontignans and Muscats. Some consider that it proceeds from the roots being too deep in the ground; others think that it is occasioned by the temperature of the earth in which the root grows (when vines are planted outside the house) being so much lower than that of the atmosphere within; and some attribute the disease to a want of air.

"Having observed that early-forced grapes are, in general, free from this disease, and that it never occurs to grapes grown in the open air, and having found, in a house under my care, that some bunches immediately over a steam-pipe were free from it, I have come to the conclusion that the cause is stagnation of cold moist air; and the remedy, the application of artificial heat, to such an extent (even in summer, when the weather is cloudy,) as to admit, every warm day, of opening the windows sufficiently to occasion a free circulation of air. A gardener, to whom I stated this as my opinion of the sub-

ject, has practised my plan, every year since, with the most complete success."

Vol. 11, p. 493, the same author remarks: "In the paper sent you and printed in vol. 10, page 137, you omitted to insert what I think the most important matter. In the paper alluded to, I considered it was from the footstalk of the berry not being grown sufficiently firm and hard, which I believe is the only cause. If the grape is grown in a humid atmosphere, it elongates the footstalk, and causes it to be of a slender, thin, delicate texture, and, in case of a sudden change, even for a short time, the footstalk is easily affected. When this injury takes place, as I believe, from the delicacy of the footstalk, the sap ceases to circulate in the manner required. I think this disease may be remedied by keeping the early-forced grapes with less humidity in the house than some use when the crop is young, which helps to elongate the footstalk. In later grapes, if there were more air admitted, or artificial heat kept up in cold damp weather, either would remedy the disease; but, as I stated in my former paper, give air and artificial heat at the same time. As I am making this second attempt to impress on the mind of the reader that the cause is really in the footstalk, I can and will advance a few things to make it more evident.

"I was asked this season, by a gardener, what I would say to a vinery being left a little open all night at top; my reply was, I had not tried it, but I would not hesitate in saying it was more likely to do good than harm. He said that there were the finest grapes in a house so treated that he had seen all the season. I was asking a

gardener, about Christmas, how his grapes had done this year; his reply was, Very well; I adopted your plan, (except one light, which I could not move,) giving plenty of air. The grapes under the light, which I could not move, were not so good as the others. In a house I had this disease take the crop, with the exception of a vine at the end, where the steam-pipe entered, producing a great and drying heat; and there was a door, with a ventilator over it, which all aided to keep off the disease. This vine alone was always free from it: this speaks for itself. Perhaps many may think I am too sanguine on this subject; but should I be right in my opinion, and in the means of producing a remedy, I shall be vain enough to think I have done some real good. Should any person really find the correctness of it, I hope they will do me the favor to acknowledge it in your magazine, which will be attended with some good; and should it be fairly proved my idea is wrong, I invite the same insertion from those who may have proved it to be so; but let them give it more than one trial, and fair ones, for I have no desire to mislead."

Vol. 11, page 603. "Having been troubled with the shrinking or shrivelling of grapes, more or less, for several years, I am determined to add my testimony to that of Mr. Parkes, that some good may be effected by leaving air in the house all night, &c. &c." This writer agrees with Mr. Parkes in the plan of giving air as the remedy, but does not admit that the length of the foot-stalk can be the cause.

Vol. 12, page 244. Mr. Jasper Wallace thinks that "the principal cause of the shrinking of grapes is owing

to the ROOTS BEING OVERHEATED and not having sufficient moisture, when planted in the inside border."

Vol. 13, page 261. Mr. J. Robertson, Nurseryman, says: "There has been much discussion in your magazine on the cause of, and remedy for, the frequent shrivelling of grapes, about the period of ripening, in stoves and vineries. Being unluckily privileged, by my own ill success, to offer an opinion, I must attribute it, in my case, (for I think it may proceed from various causes,) to their being enveloped, at that season, in the warm, humid atmosphere generally maintained in stoves.

"In my former communication on the shrivelling of grapes, (vol. 11, page 603,) I fancied I had hit on a plan that, in some degree, prevented the footstalks of the berries from turning black, but now, after another year's practice, chance, as it often does, has thrown in my way something which I never could have discovered without it. I am convinced, that too moist an atmosphere is not the cause of the shrivelling of grapes, but that it arises from the inability of the vine to provide a sufficient quantity of nourishment for the berries. The inability of the vine to provide for its fruit may arise from different causes, such as overcropping, the foliage being too crowded, &c."

Vol. 16, page 598. By W. H., (Mosely Hall.) "Several articles have appeared, at different times, in the Gardeners' Magazine, on the shrivelling of grapes. I have tried every one of them, as they made their appearance, but without the least success. In Dr. Lindley's Theory of Horticulture, article Bottom Heat, it is there stated that the cause is, that, the roots being in a colder

medium than the branches, the supply of sap is consumed quicker than the roots can furnish it, and this brings on the disease. Dr. Lindley, every one must allow, is very high authority ; still I doubt this being the cause of the blacking of the footstalks, which is the disease that I particularly wish to refer to. I have the management of three houses in which grapes are grown. One, I begin forcing the first of January, one, the first of February, and one, the first of March. The first house ripens its fruit in May, the second in June, and the third in July. In the first and second, there shall be no shrivelled berries, in the third, if the weather is cloudy, there shall be a great many. The covering is taken off the borders about the beginning of April, and, if the coldness of the borders was the cause, I should suppose that those which ripened in May and June would be more subject to the disease than the July one, for the earth undoubtedly gets warmer as the summer advances. I have been a grape-grower for more than twenty years, and, during that time, the disease has particularly engaged my attention, as I have always been more or less subject to it, and I am fully convinced that it is caused by the borders being made too rich and stimulating, and by a deficiency of light. My borders are all prepared in the same way, and of the richest materials, and the one that I commence forcing in March produces foliage of the most luxuriant description ; those large leaves require more light to elaborate the sap than smaller ones, and, if light is deficient, the sap is not properly prepared for the healthy nourishment of the fruit, and this brings on the disease. I have known vineries where borders have



been made inside of the house, and vines planted against the back wall, and borders made outside, and vines trained up the rafters. The grapes upon the back wall have, every one of them shrivelled until the vines upon the rafters had been shortened so as to admit the light upon the back wall, and then the grapes have done well, plainly proving that want of light was the cause, and not the want of heat in the border. In early forcing, I have covered one half of the border with hot dung and leaves, two feet thick, the other half, six inches, and I never could discover the least difference in the growth of the vines inside, or in the fruit. The larger the leaves are the more light they require to assimilate and decompose the sap; and this, in my opinion, is the reason why early forced vines do not shrivel, their leaves scarcely ever being more than half the size of those begun in March, and the light in May and June is commonly greater than that of July, which is, in general, a dull and showery month. After trying everything that I had seen recommended as a remedy, and feeling fully convinced, in my own mind, that want of light was one of the causes, I thought I would try what effect proportioning the heat to the light would do. This I have practised for several years, and with a success beyond my expectation.

In dull weather, I keep the house cool, and, when the grapes begin to color, if the weather is warm, I leave the top and front lights a little open, so as to keep up a regular circulation of air in the house night and day; and, if the weather is cold and wet, I shut the front lights, and a little fire is made in the front flue so as to cause the air to circulate, but nothing like forcing is attempted.

By this simple mode of management, I have so far conquered the disease, that, instead of losing half the bunches, I now only lose a few berries here and there in some of the bunches, and a few at the points of some of them, but not any of any consequence. I never expect to get entirely rid of it, as the great fault lies in the formation of the border. We consider the vine to be a gross feeder, and therefore think that it is impossible to make the border too rich, but this is certainly a great error."

Vol. 17, page 45. By Robert Wilson, Gardener. "There has been so much discussion on the shrivelling of grapes, that I make bold to give my humble opinion also, more especially as I consider our friend W. H. (vol. for 1840, page 598,) not altogether correct in thinking that the shrivelling proceeds from the border being too rich and stimulating. Crowded foliage will be injurious, as far as preventing free access to light and air. Nor do I acquiesce with our learned friend Dr. Lindley, in supposing that it proceeds from the roots being too cold for the internal atmosphere. I had vines under my care at Edgerston, in Roxburgshire, in the spring of 1837, when the thermometer stood at  $13^{\circ}$  out of doors, and the internal atmosphere was  $72^{\circ}$ . The vines were planted on the outside of the house, with their stems wrapped up with moss, and the border mulched. They were planted in a compost of strong hazelly loam, formed from the sward of a pasture thoroughly decomposed, and one fourth vegetable mould of decayed tree leaves, one sixth of good rotten horse and butcher's grub dung, and a little sheep dung, with a moderate quantity of powdered bones and lime rubbish. The borders were frequently watered with

liquid manure water from the drainings of a dunghill, and we never had a shrivelled grape during the three years I was there; and these grapes have never failed taking the first prize for the best flavored bunch at the Jedburgh Horticultural Society, for many years past; and there are vineries in this neighborhood that have borders not above three feet deep, upon a gravelly bottom, which have not been renewed this fifty years, that have had abundance of shrivelled grapes in them every year lately. I think the foregoing remarks prove that it is neither the coldness nor the richness of the border that is the occasion of the shrivelling. Now, in my opinion, damp, stagnant air is very much if not altogether, the cause of the shrivelling of grapes after they commence their second swelling. If there should not be a free circulation of air in the house, they will shrivel, and, if the weather be wet or cloudy, they will not do with high forcing. I am certain, from experience, that W. H. is perfectly correct as to the air, and keeping a dry atmosphere."

Vol. 17, page 47. Another writer says, "Never thin out the berries until the seed is formed, and let the berries touch and press each other close when ripe;" this, he says, will prevent all shanking.

Vol. 17, pages 47 and 48, J. W. B. says, want of food is the sole cause, and "this deficiency of nutriment might arise from various causes, but, undoubtedly, the principal one is a bad border; under which head, I include not only poor hungry soils, that are incapable of supporting a plant in vigor, but those deep and narrow pits of rich earth in which vines are generally planted.

and even borders of proper dimensions, if the subsoil is wet and the drainage imperfect. Depend upon it, the most essential condition in vine culture is a border so constructed as to insure a ready passage of superabundant moisture in the wettest seasons. The young fibrous roots of vines are exceedingly tender, and soon rot when soddened in cold wet soil; consequently, the plant, being thus deprived of its mouths, may starve in the midst of plenty. According to the extent of the injury to the roots, so will the fruit suffer. On the same principle, (deficient nutrition,) over-cropping will produce the same result, even when the roots are in a healthy state."

Any quantity of extracts might be added to these, but the above are sufficient to show the extent of the disease, and the principal reasons assigned for its cause by practical men. The Frontignans and Muscats are more subject to the evil than any other varieties, and the cause in these cases undoubtedly often may be, injury to the roots from too much moisture; for these vines will not succeed in any situation but where the roots can be kept dry, at the approach of the period for the maturation of the fruit. Nor will they succeed thus situated, unless they have a free circulation of hot air around their tops; and, when the fruit is ripe, this circulation of air must be continued, and attention given to keeping it as dry as possible, otherwise the fruit will soon decay.

In conclusion, it may be, in my opinion, thus summed up, that shanking or shrivelling is a disease peculiar to the grape in its culture under glass structures, caused by a deficiency of nourishment, which deficiency is occasioned principally by a defective atmosphere in the house,

causing stagnation in the flow of the sap ; and this difficulty may be increased, and the spread of the evil promoted, by various causes,—such as a poor border, general weakness of the vines, overcropping, and chiefly by not paying due care to the ventilation of the house. Where the person in charge of the grapery has command of artificial heat, by following, to the letter, all the directions given by me for the culture of this fruit, and constantly causing the temperature of the grapery to be as directed, he will have little to apprehend from this trouble.

If it is intended to plant vines, to be trained on the back wall, the soil, on the inside of the house, must be prepared, as directed for the border on the outside.

If figs are to be planted, the same border is recommended.

Peaches do not require a rich border, and, for them, the natural soil will be suitable.

To improve a poorly made, or exhausted border, in a house already built, where the vines do not succeed well, the following process is recommended as best adapted to cure the original defect :—

In the spring, have the border covered with two or three inches of lime rubbish, or oyster shells ; let this be forked into, and well mixed with, the soil ; after this, have the whole border covered, two feet deep, with fresh stable manure,—the newer the better ; the object being to cause a strong heat above the roots of the vine, thus drawing them to the surface. This should remain on the border two months, when it may be removed. It is probable, the young roots will have penetrated the border,

and be growing in the under part of the manure ; if so, these must not be injured, for, if they should, the benefit expected from the operation would be lost ; when it is found that this is the case, that part of the manure must remain on. After removing the manure, the border should have a top dressing of three or four inches of well decomposed cow or hog-pen manure.

### PLANTING THE VINES.

In planting, which is the next operation, open a hole sufficiently wide to admit the roots being spread out to their entire length ; care must be taken to spread out all the roots separately, without injury to the small ones, and do not let them overlay or interfere with each other ; make the soil fine, and cover them with an inch or two of it ; with a rose watering-pot, settle the soil and roots, by giving them a thorough watering ; finish covering, and do not water them again.\* They should be planted

\* I recommend the planting of vines for the crop of fruit on the back wall as being the most likely to give satisfaction ; for, although they do not give as large crops as the rafter vines, yet they yield better fruit than the peach ; the fig does well thus situated. When the house is strongly and early forced, peaches and cherries do not succeed ; the fruit of the latter, if it was sure, would be desirable, but it requires more air in setting than is good for the grapes.

“ Vines do better with their roots inside the house than outside, if well managed, and nothing placed on the soil in which they grow.—*Gardeners' Chronicle*, p. 680, Oct. 1846.

I am willing to admit, that vines do as well, thus planted, when as it is said, they are “ well managed,” but they require more care in watering, etc. I am not willing to allow that they do better, and never would advise the rafter vines to be thus placed, unless they can roam at pleasure in the



about three inches under the surface, and three to four feet apart; if the border is only twelve feet wide, five feet is near enough, or, if very large bunches and grapes are desired, without regard to the quantity produced, they should never be nearer together than four feet, be the border narrow or wide. If the house has been built on posts, as directed, let the head of the vine, after planting, be three inches from the front, on the inside,—the roots being on the outside. If the vines are planted in the fall, they should be cut back to three eyes immediately; but, if planted in the spring, they must be allowed to grow until the shoots are one inch long, when rub off all but the three lower shoots.\*

#### VINES FOR PLANTING.

The vines for planting should be in pots, and one or two years old; before planting, they should be kept quite dry a few days, as the roots are more easily separated.

If the plants are growing, leave off watering them until they begin to droop, when you can plant them out; the risk of injuring them will be lessened, and the free

open border; when the vines are planted on the inside, the roots will grow with rapidity, and push as straight as possible for the border outside of the house, thus proving that they prefer to be under the influence of the full effects of the sun, air, and rain upon the soil.

Do not shake the vine after planting, as sometimes advised; it can do no good, and will probably break some of the rootlets.

\* If the border is in a suitable condition, the vines do equally well when planted at any time after the fall of the leaf. If they are in pots, I know of no reason why they may not be planted at any season of the year.

watering, after the roots are spread out, will immediately settle them in their position, and they will grow rapidly.

If grown on the place, or to be obtained near, young plants, in pots, just rooted, can be used. Turn them out with the ball of earth entire, and plant, without disturbing the roots, on the inside, near the front of the house.\* I have planted such vines, and they have come into bearing as soon as older ones; they are to be preferred to old vines, as the latter are very much injured in transplanting, if they have been growing in the open border; if in pots, the roots are so matted together, that, in separating them, many will be broken off.

#### GRAFTING THE VINE.

T. A. Knight, Esq., in a paper read to the Horticultural Society, in September, 1821, says, "I selected three cuttings of the Black Hamburgh grape, each having at its base one joint of two years' wood; these were inserted in, or rather fitted to, branches of nearly the same size, but of greater age, and all succeeded most perfectly. The clay which surrounded the base of the grafts was kept constantly moist, and the moisture thus supplied to the grafts operated very beneficially, at least, if it was not essential to the success of the operation."

Mr. J. D. Parks says, "The best time for grafting is when the stock is far advanced in growth as the setting of the fruit. The stock should then be cut down, the

\* See Growth of Vine, remarks relative to Mr. Roberts's system.

scion having been kept in a dormant state.—*Loudon's Magazine*, page 494, vol. 12th.

In grafting vines, I have cut them off at the surface of the ground, and with a knife have split the stump in the middle and inserted the grafts, cut in a wedge shape ; they have always grown. (See grafting, as practised by Mr. Cleveland and Dr. Sidney Weller.)

#### TREATMENT OF THE VINES.

##### *First Year.*

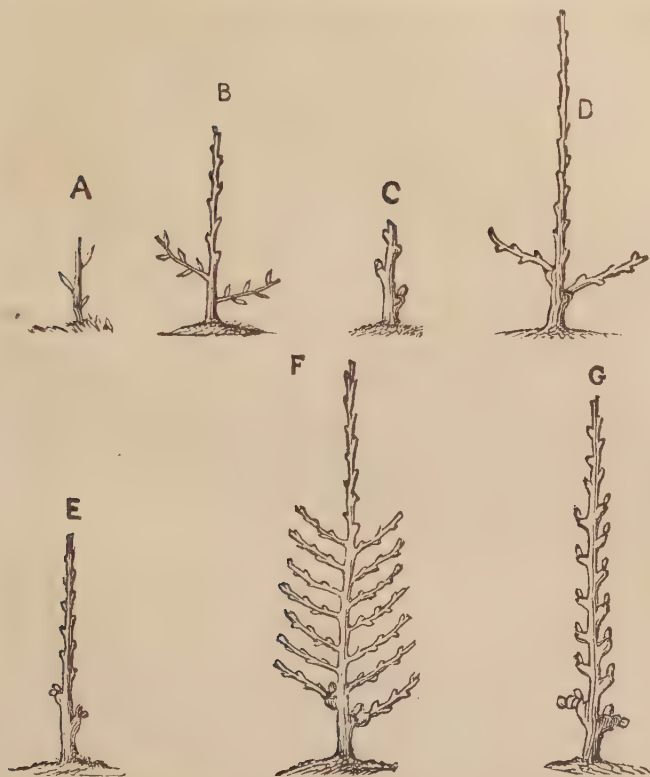
The first year, they should not be forced, but allowed to push naturally as the season advances.

In the vicinity of Boston, they will push their buds early in April ; let the shoots from the three eyes grow until they are two or three feet long ;\* train up the leading one to the roof, and stop the other two, by pinching off the end of each ; the leading cane must be stopped, when it reaches the top of the rafters ; the vine will be strengthened, by allowing it to make a free growth ; after September, stop all shoots as they push, that the vine may the better ripen the wood.†

Early in the spring throw open the house and give air

\* Perhaps it is best to allow all the lateral shoots to grow, the first three months of the first season after planting, to guard against accident to the leading shoots, as any check to the growth of the top is felt, in a corresponding degree, by the roots. For instance, if only one shoot is being trained up, and this should be broken out, and the vine should make a second, it would be but a weak one, and a loss of one year in the fruiting would be the result.

† Vines will grow as rapidly in a moist temperature of 80° or 90° as under any circumstances.



*A*, is the vine after it has been cut back at planting.

*B*, shows it at the end of the first year.

*C*, shows it cut back at the fall pruning of the same year.

*D*, the end of the second year.

*E*, at the end of the second year, cut back for fruiting.

*F*, at the end of the third summer.

*G*, the end of the third summer, cut back.

If the spurs become too long in a few years, you must allow one of the buds, that are constantly pushing on the back wood of them in the spring, to grow, and, at the fall pruning, cut back to it.

freely, continuing to do so during the season, when the mercury is above freezing; it is best to shut up the house at night, leaving one or two lights a little open, to let the moisture escape. It will not be necessary to syringe the vines, provided they have ample moisture at the roots. If the weather is dry, and the vines are not growing well, give them two gallons of water each at night, and repeat this two or three times a week while the drought continues. If your border is poor, liquid manure should be given occasionally.

After the leaves have fallen, which will be in October, or early in November, cut back the two spurs to one eye, or bud, each, and the long cane to two eyes. If any insect has been troublesome, to destroy them, or their eggs, wash the vines carefully with soap suds, moderately strong. The first of December, protect the vines for the winter, by a covering of straw, or Russia mats; the border must also be covered with seaweed, or coarse litter, to protect the roots from frost. This completes the management for the first year.

### *Second Year.*

The second year, as the spring advances, and the power of the sun increases, open the windows and doors of the house to let the heat escape, and to prevent the vines bursting their buds, shutting up again before night; do not hasten the pushing of the vines, but rather keep the house cool until the tenth of April, when it will be best to uncover them; promote a free circulation of air in bright weather; give some ventilation on cloudy days;

shut up the house before the sun sets. About the middle or last of May, the four eyes will have grown, each, one or two feet; train up the strongest of the two on last year's wood, and shorten back the other three, by pinching off the ends of the shoots; during the season, give plenty of air in fine weather, and shut up the house at night. The best way of training the vines is by iron rods, parallel with the rafters, having three of them; a centre one, to which should be tied the cane, and one on each side of this, about eight inches distant, to tie the bearing shoot to; in a cold house, they should be ten inches from the glass, and, in a forcing one, fourteen inches.\*

As the leading cane grows, tie it carefully to the rod,

\* Some persons prefer the rods to run horizontally the whole length of the house, which is the preferable mode when the vines are planted at three feet distant from each other, and no regard is paid to placing them under the rafters. This is the method used in the houses which I have recently erected. On the front, or upright part, there should be two of these; the first about eighteen inches from the ground, the second at the proper distance (10 or 14 inches,) from the roof; on the rafters, the first one should be placed about twelve inches from the plate, and the last, or upper one, at about fifteen inches from the ridge-pole; the intervening ones may be at distances of three or four feet, as deemed best. With this method of training, small wires, running parallel with the rafters, should be attached to the ridge-pole, or upper rod, and, resting on the other rods, be brought down and secured to the sill, one on each side of the stem of the vine, at about ten inches from it, to support the lateral, or fruit bunches. The rods should be of one quarter inch iron, secured at the ends to the wood work by screws. In the interior, they must be fastened to the rafters by iron pieces, which should be three eighths of an inch in thickness, and five or six inches long; these are secured by two screws (on a flattened end,) into the rafters, with a socket on the other for the rod to rest in, which must be closed firmly, by pincers, after insertion.

Vines on the back wall may be trained on wire, or other trellis, as may be most convenient. (See trellis for out-door training.)



or trellis ; stop all the laterals as they appear at one eye or leaf ; continue to check them, as they push again, in the same way. The second shoot on last year's wood may be cut entirely out in June, or, as soon as it is certain that no accident to the leading cane will require the use of this as a substitute ; the shoots on the spurs of the old wood must be stopped, as often as they push, by cutting them back to one eye.

Stop the leading cane when it has grown about fifteen feet, and before it reaches the top of the house ; allow the upper lateral to grow ; this will prevent the eyes on the upper part of the cane from bursting. This lateral should be cut back to one eye, after it has grown three or four feet ; if it still continue growing strong, check it again.

Early in July, dust sulphur on the floor of the house, to prevent mildew ; to be effectual, one pound should be used for every twenty square feet of the house. If mildew should make its appearance, and continue to increase, syringe the vines at evening, and dust the foliage also with it.\*

Mildew is a fungus, which perfects its seed in a very

\* Nathaniel Silsbee, Jr., Esq., informs me, that in his grapery, which is a cold house, he covers the floor twice, every summer, with sulphur, and recommends its application in the middle of the day, as, at that time, part of it will rise and settle on the vine, but, in such small particles, as to do no injury. He has found this effectual in preventing mildew. If this fungus makes its appearance before the sulphur is applied, it will be more difficult to suppress its growth. It has been very troublesome, in late houses, this July, (1848,) and I had to dust the foliage and fruit before it was checked, and the quantity used was much greater than that named above. In early houses, I never have it.

short time, and spreads rapidly over the fruit and foliage, if not destroyed. When only a little of it appears, wiping with a soft cloth will remove it effectually. It usually comes on the vine in Massachusetts, in foggy weather, in July and August, and resembles white mould; when observed in this fresh condition through a microscope, it is very beautiful. Another evil, a disease to which the grape is subject, appears on the vines and destroys more or less of the foliage at the same season of the year, and with the same weather; it is called the *blight*. The two are often confounded, and considered the same. I know of no remedy for it. The mildew is promoted in its growth by dampness, and by the east winds. It operates singularly. A vine in the open air in my garden, trained on the south of the house, is very little injured by it; branches of this vine, extending round the corner of the house to the east side, are yearly so badly affected that the fruit is valueless. Downing, in the *Horticulturist*, says, "that giving the soil a plentiful supply of plaster of Paris, and this turned under immediately, is a complete protection against mildew in the open air." I have tried free applications of this remedy, sulphate of lime, and have not derived any benefit from it. Other persons have recommended lime and ashes to be applied in the same way to the soil, as a certain preventive.

The rust on grapes, which seems to trouble English cultivators, does not prevail to any extent in the northern states of America. What little there is, usually is produced by the grapes coming in contact with the moisture of the hand, or the hair. When the grapery has

back and end walls, washing them with lime and sulphur is useful as a preventive against mildew.

In September, begin at the lower part of the cane, and, with a sharp knife, cut clean out all the laterals for eight or nine feet, leaving those on the upper part of the cane to be cut out in the autumn pruning; be careful, in doing this, not to injure the bud or the leaf of the cane where you cut, for from this eye your fruit is to come next summer.

As soon as the leaves are falling, cut back the cane to eight or nine feet, and the two spurs to one eye, each.

With a painter's brush, put on the vines a composition of soft soap and sulphur, in the proportion of four pounds sulphur to two pounds of soap; be sure to cover all the wood, and particularly around the eyes. To prepare this wash, mix the two substances well together when cold, and pour hot water upon them; it should be of the consistency of cream when put on the vine. You can thicken this wash with a little clay.

The first of December, lay down the vines, horizontally, near the ground on the front of the house, and cover them from the sun. Russia mats are the best for this purpose; cover the border as last year.

This will end the second season of their growth. So far, we have considered the house a cold one, or without fire heat; if the vines have been planted in a greenhouse, and a fire kept up, then they will have started in February or March;\* if they are so situated, let the house be

\* The only serious objection to growing grapes in a greenhouse is the trouble caused from insects which infest the plants in the pots, and spread, not unfrequently, over the vines. The red spider is the most injurious, and,

kept at as low a temperature, night and day, as the safety of the plants will admit ; the treatment should be the same for the season, except the covering of them with mats, which would be unnecessary.

### *Third Year.*

The third season, air the house, as directed the last year ; uncover the vines from the first to the middle of April, as the spring may be mild or cool ; keep them in their horizontal position, until the eyes have all pushed ; have a moist atmosphere, by sprinkling the vines and the floor several times every day. About the twentieth of April, or the first of May, they will have pushed their buds so as to be all ready to be put to the rods, or trellis.

During the season, give air freely when the sun shines ; shut up the windows towards night, as the sun recedes from the house. The mercury should not rise above seventy-five, until the blossom is over ; after that has passed, eighty or ninety, at midday, will do no harm ; occasionally, wet the floor of the house in the afternoon ; the inside border must be watered as often as the roots of the vine require ; continue this treatment for the season. As the grapes begin to color, be cautious in watering, and, after they are fully colored, do not give water at all until the grapes are all cut, leaving open

in the autumn, the insects, (if any,) when the leaves drop, are, by these means, conveyed to the plants again. In the treatment of the vine thus situated, the rules for pruning, thinning, &c., must be followed. As regards temperature, etc., they must be subject to the treatment given to the plants, so long as the plants are in the house. It will be the better plan to keep the vines from pushing, as long as possible, in spring, by having as low a temperature as the plants will thrive in.

some of the lights at night, unless there is danger of frost, or rain.

About the last of May, the shoots will be from one to three feet long; train up the leading one the same as last year, and cut back the others to one leaf beyond the bunch of fruit to be retained for ripening; the bunch nearest the cane is the one usually left on for this purpose;\* cut off all the others; never leave more than one bunch on a spur, and cut away all the fruit from every alternate spur; when this is done, and there are still more than eight good-sized bunches remaining, reduce them to this number; these will be quite enough for the vine to mature the first year of bearing; if the bunches are very large, you must cut off still more; do not allow over ten pounds of fruit to ripen on each vine; they probably will average not less than one pound to the bunch.

Occasionally, it will be necessary to go over the vines and stop the laterals that push on the leading cane and on the spurs, by cutting them back to one eye; it will be found a saving of labor, to perform this pruning at regular intervals of a fortnight during the season; continue this until they cease growing; the leading cane should be stopped as soon as it reaches the top of the house, leaving one or two laterals at the top to grow a few days, when you should cut back one of them, and leave the other a few days longer, when that must be cut back also.

\* It sometimes happens, that a spur will have four or five bunches on the shoot, the nearest one to the cane being at the second leaf; when this occurs, it is best to leave, for ripening, the second bunch, cutting away the others.

I do not syringe the vines after they are trained to the trellis, and do not think it ever necessary, provided the house is kept moist by watering.

The vines will begin to bloom early in June ; when the berries are as large as peas, begin to thin them ; cut out all the small ones first ; no rule can be laid down as to the number to be taken out of each bunch, for the same kinds set their fruit more or less thickly in different years, and in different situations. Of Black Hamburgh, I usually cut three out of five berries ; of Zinfindal, eight out of ten ; of Chasselas, when they set well, five out of ten : experience will soon teach one what is proper to be done. If the shoots from the spurs have not been tied to the rods, they should be as soon as the thinning is over ; do this carefully, and let them be at equal distances ; a little attention to this will improve the appearance of the vines very much.

Examine the bunch as the grapes swell ; if they are pressing together, cut out still more, always taking the smallest berries. In thinning, avoid touching the grapes with the hand ; the moisture of the flesh causes rust ; if it is necessary to handle the bunch, gloves should be worn. After they begin to change color, if it is necessary to thin them more, the scissors must be used cautiously, in order not to injure the bloom, and thereby destroy the beauty of the bunch.

Early in July, spread the sulphur, as directed the last year. The grapes will begin to change color in August, and to ripen about the middle of September.

“ If the fruit-bearing branch be not very vigorous, it ought, in July, to be cut off close to the fruit. In the



heat of summer, some leaves are necessary over the fruit to shelter it from the sunbeams until it is half ripe, and then bareness\* is requisite to bring it to maturity."—*The Complete Gardener, etc., by M. De la Quintiney, London, 1719, page 157.*

"Nets may be used to prevent birds eating the fruit, and vials with water and honey, or a little sugar, hung upon the branches, will induce flies to drown themselves, which, (when a considerable number are in,) must be emptied, and renewed as before."—*Ibid*, 157.

When ripening off, if the berries do not swell or color well, and, in black varieties, are of a pale red color, feeling soft, if touched, you may be assured the vines are not strong enough to ripen the crop; cut off the lower part of the bunch of some, and the whole of others; selecting, for this purpose, the bunches which are the most affected in this way, and reducing the quantity on the vine one third, or one half, and do so as soon as you suspect this is the case; by these means, you may save the residue of the crop, and, at the same time, relieve the vine from the exhausting effort of attempting to mature it. This is a trouble caused by overcropping, and is entirely distinct from what is usually termed shanking;† for this disease,

\* The leaves on the shoot bearing the fruit must never, on any consideration, be removed; if necessary to let in air and light, prune out the laterals and cut back to the bunch. The whole tenor of this remark is only applicable to European culture; with our American varieties, this practice would be highly improper. It would be better never to prune or stop a shoot than to do thus. I would advise the opposite, and say, if a shoot is very vigorous, and is drawing an undue share of the sap to itself, to the detriment of other parts of the vine, check it by stopping the end of the branch, to promote the growth of the weaker ones.

† Shivel or shanking in grapes is caused by a disease on the skin of the

after it has once taken hold of the bunch, there is no remedy ; the part affected must be lost. In September, cut out all the laterals from the new cane, as directed last year.

This treatment of the vine will give you delicious fruit, well-colored, and, consequently, high-flavored ; in black grapes, it may be laid down as a general rule, that *when fully ripe*, the blacker the grape, the more spirited and richer the juice ; bunches weighing about one pound are usually better ripened than larger ones. The berries of the Black Hamburgh, grown by these rules, will measure three and four inches round. This grape is often grown of a slightly reddish tinge, and sometimes with very large berries, very sweet, indeed, but deficient in flavor.

This is a simple process, but the practical operation of it involves much labor and unremitted attention. After all is done that is required by pruning, thinning, watering, &c., much depends upon the proper ventilation and heat of the house ; this must be opened and shut as the weather changes ; if clouds are constantly passing during the day, and the sun alternately obscured or shining, it will be difficult to regulate the temperature ; a partial opening of the top lights will allow the heat to escape,

footstalk, or stem of the bunch ; in either case, it causes the fruit beyond the affected spot to shrivel, turn acid, and become worthless. When only the footstalk is injured, it is termed shrivel ; when a shoulder, or part of the main bunch, it is said to be shanked. When it first appears, it is of a brown color, and is on one side of the stem only ; at this time, removing the spot with a sharp knife will often stay its progress ; when this is not done, it will soon spread around and meet, thus girdling the part affected, and as completely destroying the fruit beyond, as if it had been cut off.

and prevent too great an accumulation of it; the person having charge will soon, by attention, ascertain how much ventilation is required under such circumstances.

It will be preferable to have a low temperature, and changing between sixty-five and eighty, than by having the house closed, the heat raised, for even a very short time, to one hundred, or one hundred and twenty, which would be the case in changeable weather, should the sun shine forth suddenly, and the house be entirely closed. This must never be allowed, but, as soon as there is a prospect of the sun shining, open the lights a little, and continue opening as the heat increases.

Avoid sudden changes of the temperature as much as possible, and the air should, at all times, be admitted gradually.\*

\* In regulating the temperature of the grapery, care should be had to prevent the too great accumulation of heat from the sun; to avoid this, the windows, or the ventilators, must be opened a little as soon as the heat begins to increase, and thus, little by little, as the mercury rises; by this method, your vines will not be exposed to the injurious effects of sudden changes, as would be the case, if you allowed the windows and doors to remain closed until the sun shone full and strong upon it; in such management, upon admitting air, the temperature would be lowered in consequence, which, with an increasing of the sun's rays, would be highly improper, and should never be allowed. Some sudden change may render this rise of temperature, in a degree, unavoidable; if this should occur, air must be allowed to enter at once, in sufficient quantity to prevent any further accumulation of it.

In a grapery without artificial heat, it is best to accustom the vines to a plenty of air, and a temperature somewhat in consonance with that without. Should you, in bright and fine weather, use them to a very high temperature, the vine would be made to require this, and, at the time of ripening of the fruit, when the climate is always cooler, should the weather be cloudy, or otherwise unpropitious, you would have no means at command to raise the temperature, and the consequence would be a loss of part of the fruit by shrivel and shanking.

Never allow any of the leaves of the vine to be taken off for the purpose of admitting the sun to the grapes.

If aphids, or the vine-fretter, appear on the vine, fumigating the house with tobacco will destroy them. If red spiders are troublesome, moisture and sulphur are the only remedies; syringing the vines at evening, and dusting the leaves with flour of sulphur.

In September, all but the last lateral on the spurs should be cut out.

When the leaves are off, early in November, cut back the leading cane, leaving four feet only of the new, or this year's growth; this will now make the entire length of the cane twelve or thirteen feet; cut back, close to the old wood, the spurs that have fruited this year; those that have not, cut back to one eye, or bud, to bear fruit the coming season; clean and put over the vines the soap and sulphur, as before; and, the first of December, lay them down and cover them, as last season. Washing the back wall of the grapery with flour of sulphur, added to common lime whitewash, will destroy insects, and have a tendency to prevent mildew in Summer.

If the spurs are too close together, you can cut out those that are not wanted; they should not be nearer together than four inches; this would make them eight inches apart on each side the cane, and closer than they are often grown; if nearer, they would obstruct the light.

#### *Fourth Year.*

The fourth year, follow the same directions for venti-

lating, giving air, and watering the vines and the floor of the house as heretofore.

After the vines are secured to the trellis, and the shoots are one or two inches long, rub out, from the spurs which were cut close, all but one shoot; this you must leave to grow for future use; do not allow it to bear fruit this season.

If the vines are strong, and were not injured by overbearing last year, you can now leave on each vine fifteen bunches, that will weigh one pound each, to ripen this season; let the bunches be distributed, at proper distances, over the vine. The leading cane should not be allowed to bear fruit until it has become established at the length desired for permanent use, when it can be fruited as well as the other shoots. Very strong, healthy vines will often show, on this length of cane, sixty to one hundred bunches; and it requires some firmness, in an inexperienced person, to cut out in this free manner.\*

\* Grapes under glass, and in the open air, almost invariably do well the first and second year of fruiting. This is undoubtedly to be attributed to the fresh soil having, in its constituent parts, all the requisite ingredients. The cause of their bearing fruit in a diminished degree after this may be, that some substance was supplied in a small quantity, and has become exhausted, or, it may be that the vine has been too highly excited by stimulating manures, given too freely at first, and not continued; but more frequently, I apprehend, by suffering the vine to mature too much fruit.

*Pruning.*—"In your leading article, on the subject of the vineries at Bishop's Stortford, you concluded by saying, that the vines there were pruned on Mr. Crawshay's system. [This is giving a new and improper name to an old system; it has long been in use in France, and is known as the close-spur system of pruning, its proper appellation.—EDITOR.] I presume, from that general allusion, that the system is well understood by professional gardeners; but I rather think it is not as universally known as it would seem to deserve, if it can be proved to be certain and successful. In all treatises I have read on pruning the vine, from Speechly downwards,

Prune at the same time, and in the same way as last year; and, at the autumn trimming, leave four feet more of the new cane; this will now be sixteen or seventeen feet long, and of sufficient length to bear as large crops as the vine should ever be required to do. In November, clean and place the vines, and protect them from frost, as heretofore.

I have never met with any which has detailed this mode of treatment, or recommended its adoption. I have heard it, in conversation, described as the 'walking-stick system,' because its principle consists in giving very much that appearance to the main stem, which is always preserved. At each autumnal pruning, the whole of the new wood is cut off to within an eighth of an inch of the old stem. So small, indeed, is the spur left, that the growth of the wood of the following year nearly levels it with the old wood. At the point of junction of this eighth of an inch with the stem, one or more buds are developed, which, in the succeeding year, become the shoots upon which the fruit is produced. The old fashioned grape-grower sees with dismay, in this system, all the buds of the year which have grown and ripened under the influence of a summer and autumn's sun, annihilated 'at one fell swoop,' and stares, when told that he is to trust entirely, for his crop of next year, to a bud which he can hardly see. Might I ask your contributors, who delight in vine culture, whether the success of this plan depends upon the great power working at the roots,—the forty barge loads of manure, such as our friend at Bishop's Stortford supplies to the gluttony of his vines,—and which converts that which, in ordinary circumstances, would be at best but a weak wood bud, to the production of the finest fruit? Is this mode of pruning likely to be generally successful? There are, undoubtedly, many advantages in it. Amongst others, it does seem more consistent with nature, and with all our ideas of rendering culture subservient to her laws, to retain the main stem of the tree which furnishes the largest capacity for the flow of the sap; it also enables us to keep both fruit and foliage close under the rafters and thereby to secure the greater quantity of light flowing into our houses. J. J."—*Gardener's Chronicle*, 1847, p. 718.

At the exhibition of the London Horticultural Society, in November 1847, grapes of the Black Hamburgh and Muscat of Alexandria varieties from the above vineries, obtained the Knightian medal, and it was said of them, that "better specimens could scarcely have been desired."



*Fifth Year.*

Fifth year, the same general treatment is to be pursued; the leading cane must be stopped at the top of the house, leaving two or three of the extreme laterals to grow a short time, and stopping them at intervals of four or five days, the top one first.

You may now allow the vines to bear twenty pounds of fruit, and, as they grow older and stronger, you can increase the weight to twenty-five pounds. I have never seen more than this quantity ripened on a vine, in this country, (under ordinary circumstances,) without injuring the crop the year after. It is true, we often hear of much larger crops, but my experience will not warrant anything of the kind.

*Remarkable Vines.*—In England there are two very remarkable vines, which are said to produce, yearly, over two thousand bunches. One of these, that at Hampton Court, I saw in the summer of 1836; it then was bearing a crop of over two thousand bunches; they were, generally, small, however, and the berries were not large; the man having charge of the house said that it did not look as well as usual. In 1846, a gentleman who visited it describes the bunches as small, but numerous, and looking well; the roof of the house is covered with the vine; it is trained horizontally, and passes, two or three times, the whole length of the roof. The pruning is on the spur system, but a shoot is laid in, wherever wanted to fill a vacant space.

“The vine at Hampton Court Palace, which was planted in the year 1769, has a stem of thirteen inches

in girth, and a principal branch one hundred and fourteen feet in length, which, in one year, produced two thousand and two hundred bunches of grapes, each weighing, on an average, a pound.”—*Phillip's Companion to the Orchard*.

Of the Hampton Court vine, Speechly says : “ When I saw this magnificent vine in 1788, the crop of grapes was moderate, and the bunches, in general, very small. But since then, I have, from time to time, been informed of its having often produced most abundant crops, and of large and well-perfected bunches.”

“ Mr. Eden planted a vine of the Black Hamburgh sort, at Valentine House, Essex, in the year 1758, which is the parent of the vine at Hampton Court, and has extended itself to upwards of two hundred feet in length, being so productive that it ripened two thousand bunches of grapes in 1819.”—*Phillip's, etc.*

“ At Valentine, near Ilford, in Essex, (England,) the seat of the late Sir Charles Raymond, there is a vine, now growing, whose branches extend and furnish the entire roof of a pine stove, which is seventy feet long by eighteen feet broad. And, moreover, some of the branches are trained downwards, and also cover a great part of the back wall of the said building. The vine, which is the Black Hamburgh, was planted in the year 1758, and grows entirely in the inside of the stove. The girth of the main stem, at two feet from the ground, is about thirteen inches.”—*Speechly*.

“ This vine produced annually upwards of three hundred weight of fruit, and, in some seasons, upwards of four hundred.”—*Penny Cyclopædia*.

At the entrance to Spae's Garden, Ghent, "is situated an uncommonly large vine, the stem, a little above the ground, measuring one foot nine inches in circumference. We were assured that it is more than a hundred years old, and, from its appearance, we could easily believe that it may have seen even two centuries."—*Hort. Tour., Edinburgh*, 1823.

At Antwerp, "our attention was attracted by a very large and ancient vine, apparently of the variety called the Frankendale, planted in the centre of a front wall of a large house, which it now covers. The pavement of the street reaches close up to the stem, which is secured from being injured by carts, &c. by means of a wooden box.

"At the height of between two and three feet from the ground, a branch had originally been trained, horizontally to each side, the whole extent of the house, or about thirty feet in each direction. From these horizontal branches, which are now very thick and resemble trunks, many upright branches arise, which are trained vertically even to the eaves of the roof, or between thirty and forty feet high. Very few bunches of fruit were to be discovered, and it was evident that the vine was not judiciously pruned."—*Hort. Tour., &c.*

*Botanic Garden, Amsterdam.*—"In front of the greenhouse grows a large vine, about eighty years old, and which spreads over the roof. It is of the Frankenthal kind, and by much the largest tree of this variety which we have seen, the stem being two feet two inches in circumference at three feet from the ground."—*Hort. Tour., &c.*

“In Northallerton, in Yorkshire, there is a vine now (1789) growing, that once covered a space containing one hundred and thirty-seven square yards; and it is judged that, had it been permitted, when in its greatest vigor, to extend itself, it might have covered three or four times that area. The circumference of the trunk, or stem, a little above the surface of the ground, is three feet eleven inches. It is supposed to have been planted one hundred and fifty years, but, from age and injudicious management, it is now, and has long been in a very declining state.”—*Speechly*.

“In the town of Bridgenorth, Shropshire, there is a vine, which has been planted about sixteen years, which covers a wall twenty yards wide and sixteen yards high, and had on it, in November, 1847, from two to three hundred and fifty pounds of unripe grapes.”—*Gard. Chronicle*, 1847, p. 734.

The vine at Cumberland Lodge, Windsor Park, is supposed to be the largest cultivated vine in the world. “In 1843, it bore a crop of two thousand three hundred and fifty bunches, averaging one pound each; the vine, at that time, was one hundred and thirty-eight feet long and sixteen feet wide, and covered two thousand two hundred and eight superficial feet of wall. It was then forty years old.” This account of the Cumberland Lodge vine I found in some English publication, some years since, but did not minute where, as the memorandum was made for my use, without reference to publication.

Chaptal says: “I have found, in the notes I have received upon the age and size of the plant, that the frost which injured the vines in the department of Doubs, in

the autumn of 1739, while the grapes were yet on the vines, was of such intensity as to kill a remarkable vine of the White Muscat variety. This vine was exposed to the south, and protected from the cold winds; it was in the Rue Poiture, at Besançon. The age of this vine was unknown, but the stem was about six feet in thickness, the branches extended to about forty-six feet high, and spread over a wall more than one hundred and thirty-three feet. The death of this remarkable vine caused a painful sensation through the whole province.”—*Chaptal, Traite sur la Culture de la Vigne*, p. 144.

It is unusual to see a bunch of Black Hamburgh grapes weighing more than four pounds. At the exhibition of the London Horticultural Society, at Chiswick, on the 9th of July, 1836, there was shown a very fine bunch of this variety which weighed eight pounds and six ounces; it is mentioned in Loudon's Magazine as “hitherto unrivalled;” see vol. 12th, page 444.\*

A simple furnace and flue, to run along the front of the house, even when it is not intended to force, is desirable, as a small fire can then be made in wet weather, and, after the fruit is ripe, by keeping the air dry, you will be able to preserve the grapes sound a great length of time.

The fall pruning of the fourth year will leave the vine established at the proper length at which it may ever remain; the fall trimming the fifth year, and ever after, will be the same as that of the fourth,—cutting the leading cane back to the dormant eyes.

\* I had the satisfaction of seeing this bunch of grapes; it probably is the largest bunch of this kind ever grown.

If, after a series of years, the cane should become too long, it can then be cut back to the next spur from the top.

#### REMARKS ON FORCING THE VINE.

“The horticulturist, when he steps into this department, aspires to the top and mastership of his art. A full acquaintance with what his predecessors knew, as principle,—a vigilant attention to what his contemporaries offer as improvements, with a capacity to estimate new practices,—a considerable personal share of intelligence, experience, and invention,—will not more than qualify him for his profession.

“The term hot-house, and that of forcing-house, are not indiscriminately applied to the same description of place by practical men in general; nor is this a distinction without a difference.

“A hot-house may be considered as constructed to sustain plants which are too tender to live in the open air of the country in which it is employed. A forcing-house may be defined to be an artificial garden for plants which will grow in the open air, by its aid to obtain a crop sooner than the natural operation of the seasons will mature; the former is a substitute for a given hot climate; the latter is an anticipation of the local summer. The heat of the former is permanent and more uniform, resembling the steady elevation of temperature which prevails in the regions nearest the line; that of the latter fluctuates farther from a common medium; but, whether



raised or reduced, it is equally directed to an imitation of nature's course in some climate. The forcing-house, however, is frequently so assimilated in its construction and economy to the hothouse, on account of the culture requisite for plants of a mixed nature, that the difference vanishes. But both the separation and the interchange may be accounted for by the nature of any given plant. Thus the cherry will ripen its fruit perfectly in the open air; the forcing-house, for the cherry, is far removed from the hothouse. Few kinds of the grape, however favored by aspect and shelter, come to maturity under the influence of our natural summer (the climate of England); and most of the sorts which are forced would never ripen under it; the grape forcing-house and the hothouse are, therefore, convertible things."—*Encyclopædia*.

If it be intended to winter-force, you must not commence the process, the first year, before the first of March; the second year, you may begin the middle of February; the third year, the first of February, and so on, fifteen days earlier every year, until you reach the first of December; beyond this you can hardly go, as this allows only time to prune and clean the vine after it has gone into rest.

The first of March is recommended as the best time to commence fire-heat for the main crop of grapes; this can hardly be considered as forcing; it is a simple protection and aid to the natural growth, and as heavy if not larger crops can be matured as in a cold house.

In a house that is forced in December or January,

every year, ten pounds of grapes are quite as much as each vine will perfect, on an average of years.

Before making the fires, the border must be attended to ; if it was covered in the autumn with coarse litter or leaves, as directed, it should now have a quantity of fresh strawy stable manure added, and well mixed with the litter ; cover the whole border to the depth of eighteen inches, and protect this from the cold rain and snow with boards ; this will effectually prevent the frost from penetrating to the roots. The management of the vine will be the same as directed for the cold house ; the pruning, thinning, and training must all be done in the same manner. Forcing, earlier than the first of March, is attended with much more risk of failure ; the expense and trouble are more, and these are all increased in proportion as you begin before this time, and the amount of fruit which a vine is able to mature is diminished in a similar ratio.

#### DIRECTIONS FOR MANAGING THE FORCING-HOUSE.

Commence forcing your house with a temperature of  $40^{\circ}$  at night,  $60^{\circ}$  by day ; admit air freely when the sun shines ; upon the furnace and the flues, place pans of water ; the vines should be kept in a horizontal position until they are pushing strong ; syringe or wet them repeatedly during the day, and keep the air of the house moist by watering the floor. After ten days, raise the temperature to  $45^{\circ}$  by night,  $65^{\circ}$  by sunshine ; continue to keep the house moist until the vines have all broken

well, and have been put up to the trellis, when you can lessen gradually the watering; let the pans of water, on the furnace and flue, be constantly filled while the grapes are growing; after they begin to color, lessen the number of pans of water gradually, and the moisture of the house, and ripen off the fruit in a dry atmosphere.

Vines do not appear to be seriously injured by bleeding, however severe this may be. The only effect from it, which I have been able to discover, is a tendency to retard the pushing of the buds, and, on long canes or spurs, the causing of the last eye to be blind. It cannot be of any advantage to the vine, that is certain, and it should be guarded against by early pruning.

In the *Gardeners' Chronicle* for 1846, page 771, there is an account of vines which had been winter-forced, and which had ripened a crop of fruit; as it was intended to remove the vines, the causing them to bear a second crop was attempted; to effect this, the vines were severely pruned the first of May; they bled excessively; notwithstanding this, the buds broke well, and ripened the fruit in October. The wood, also, was well ripened, round, and firm, with full eyes, and, so well did it appear, that the idea of throwing away the vines was abandoned. They had previously been troublesome from over-luxuriance.

In ten days more, raise the temperature to  $50^{\circ}$  or  $55^{\circ}$  at night, and by day, when cloudy, to  $65^{\circ}$ , or, when the sun shines, to  $75^{\circ}$ . This temperature should be gradually raised at night until the grapes are in bloom, when the heat should be as equal as possible,  $70^{\circ}$  at night,  $75^{\circ}$  or  $80^{\circ}$  by day, when the sun shines. Do not let the

temperature of the house, by artificial means, rise above  $70^{\circ}$  in this stage of forcing.

In May and June, we often have some very hot days, with a bright sun and dry air, the temperature in the open air  $80^{\circ}$  or  $90^{\circ}$ , and even higher; in such weather, you cannot prevent the heat of the house rising to over  $100^{\circ}$ ; if the air should be very dry, it would burn the leaves, and injure them more to have all the lights and doors thrown wide open, than a greater degree of heat with proportionate moisture would do.

The shrivel in grapes is caused, frequently, by too large a crop; sometimes by too much moisture at the roots, and often by a sudden change of air, or too low a temperature; the best preventive for the two latter troubles is a constant free circulation of warm air.\*

In the management of your house, aim to imitate nature, by a regular increase of heat, as in spring.

Early in October, you may cut back the spurs to two eyes, if you think the wood is not ripening well; be careful and do not cut, or otherwise injure, the remaining eyes, or their leaves; this will admit more sun to the house, and promote a free circulation of air, and strengthen the eyes retained.

In winter, the mercury, in the open air, frequently falls to zero, and sometimes six and ten degrees below, with a high wind blowing at the same time.

In January, February, and the early part of March, for weeks together, it will be found, during the night, ranging from ten above, down to, zero. In such a climate, a powerful and steady heat is necessary.

\* See Remarks on Shrivel.

The boiler and pipe to circulate hot water around the house, on the level principle, together with the furnace and flue, are recommended as the best and safest heating apparatus. A furnace and flue will not heat more than twenty-five feet of a grapery that is forced in the winter months, and, for any additional length of the house, other furnaces must be added, in the like proportion, or the hot water apparatus substituted.\*

The following is a memorandum of the regulation of the heat, with the dates on which the different operations were performed, in a house forced in the winter.

November.—The vines were pruned; every alternate spur was cut at one eye to fruit; the others were cut close, as there were more spurs than the strength of the vine would admit of fruiting the coming season.

When the vines were not of sufficient length for the rafters, we retained as much of the new cane as was required, or as the strength of the vine would allow.

The loose bark was rubbed off, and the vines painted over with the composition of soap and sulphur.

The border was covered with litter.

The first of December, the vines were placed in a horizontal position, near the front of the house, and covered with Russia mats; those on the back of the house were laid down and covered in the same manner. From this date it is not unusual for the cold to be occasionally severe, the mercury falling to near zero; when this is the case, sufficient fires must be made to keep a temperature of 28° to 32° by night.

\* The Polmaise System, and the manner of building the furnace, are described under the head of Furnaces, &c.

December 20th.—The fires were made, and forcing commenced; the temperature of the house was kept at  $40^{\circ}$  at night,  $60^{\circ}$  by day; fresh stable manure was put on the border, and well mixed with the litter already there; the vines, and the floor of the house, were repeatedly watered, and pans of water placed on the furnace and flues; this temperature was kept up, and the watering continued, until—

January 1st, 1847,—when the temperature was raised to  $45^{\circ}$  at night,  $65^{\circ}$  by day, and air freely admitted, when the sun shone; wetting the house and vines continued.

January 5th.—The temperature was raised, at night, to  $50^{\circ}$ ; by day, if cloudy, to  $65^{\circ}$ ; when the sun shone, to  $70^{\circ}$ , with plenty of air admitted, and the pans of water daily replenished. This heat was continued to—

January 10th,—when at night, the temperature was kept at  $50^{\circ}$  to  $55^{\circ}$ ; by day, if cloudy,  $65^{\circ}$ ; when the sun shone,  $75^{\circ}$ , with air; the top windows were let down, every other light, three or four inches in the morning, and, as the heat increased, more air was gradually admitted.

When the house became quite warm with sun heat, the front lights were opened a little. The sun has so little force at this season, and the days are so short, that I have found it unnecessary to open the front lights, and do not advise it being done before March, and then only to a small extent; the top lights being sufficient for ventilation. In very cold days, and with a bright sun shining, the windows were not opened more than four inches; watered the house freely in mild weather, giving less in



very cold; the pans of water were kept full. This treatment was continued to—

January 20th,—when the temperature, in cloudy weather, was raised to  $70^{\circ}$  by day; during the night, and on sunshiny days, the same as from the tenth instant; and this was continued to February.

The vines, near the furnace, were all pushing, both sets at the same time, those planted on the outside of the house, and those on the inside. The mercury, in the open air, last night, was at zero; in the house, at 9, P.M., it was  $55^{\circ}$ ; at 7, A.M.,  $48^{\circ}$ , with as large fires as the furnace would allow.

January 25th.—Nine of the vines, which were nearest to the furnace, were tied to the rods.

January 27th.—Put up sixteen more.

February 1st.—The temperature, at night, was kept at  $55^{\circ}$  to  $65^{\circ}$ ; by day, and when cloudy,  $70^{\circ}$  to  $75^{\circ}$ ; by sunshine,  $75^{\circ}$  to  $85^{\circ}$ , giving air as above; and this temperature was continued until the blossom was over; the remaining vines, on the front of the house, were taken up and secured to the rods.

February 2d.—The vines, on the back of the house, were tied to the trellis; some of the shoots, on the vines near the furnace, were two feet, and some three feet long; they were cut back to one eye beyond the fruit.

February 10th.—Rubbed out all but one shoot on each spur, where it had not been done before;\* the spurs which were cut close have generally pushed, from dor-

\* This can be done as soon as the shoots are one inch long, shortly after the canes are put up.

mant eyes at their base, from two to six shoots, and most of the shoots had fruit bunches.\*

February 15th.—First blossoms opened to-day on three of the vines; shortened back, and tied out to the rods, the side shoots on several vines.

February 21st.—Blossoms have opened on the eight vines nearest the furnace, and, on the two first, the berries are swelling off; continued to stop, and to tie up, and to thin out, any of the shoots that are not wanted.

March 1st.—The temperature, at night, was kept at 60° to 70°; by day, when cloudy, 70° to 75°; by sunshine, 80° to 90°; as much air admitted as could be, with safety, allowed; began to thin some bunches on three vines; ten vines were in blossom on the front, and four on the back of the house.

March 10th.—More than half the vines were in blossom, and the grapes thinned on eight vines; the laterals on the spurs were cut back to one eye, and this check was repeated as they required it. I advise the cutting out of the laterals, situated between the fruit and the main stem, allowing those only to grow that are beyond the bunch, and these should be stopped at one eye every ten or fourteen days, as they may grow with more or less vigor during the season.

March 15th.—Temperature the same as from the first of the month; have been thinning the grapes the past fortnight; they are now finished, for the first time, and the earliest vines have been thinned two or three times.†

\* The tendrils should be cut smoothly out when they first appear.

† The shoulders of very large bunches (the Syrian) always require to be spread out and supported by strings, to permit a free circulation of air.

April 1st.—Temperature the same as in March ; from day to day have been examining and thinning the berries, when it was found necessary.

April 10th.—The first grapes began to color, near the furnace, this day. Temperature as above.

April 20th.—The Zinfindal, Early Black July, and Grizzly Frontignan coloring ; the Pitmaston White Cluster nearly ripe, and the Chasselas Bar Sur Aube changing color.

May 1st.—The temperature, at night, 70° ; by day, if cloudy, 75° to 80° ; by sunshine, 85° to 95°, with air freely admitted. The first Black Hamburgh grapes begin to color ; the pans of water were removed from the furnace and from the flue, where the grapes have colored, or are nearly ripe ; the bunches were examined, and all defective berries cut out ; all thinning, for the season, was now finished.

May 10th.—The grapes were ripe on the first five vines ; part of the fruit, from Chasselas Bar Sur Aube, Zinfindal, Early Black July, Pitmaston White Cluster, and Grizzly Frontignan, has been gathered ; more of the pans of water were removed from the flue.

May 20th.—Cut Black Hamburgh grapes fully ripe ; the grapes were all ripening in every part of the house, and have colored well ; all the pans of water are now removed, and the house kept as dry as possible.

June 1st.—The weather now being warm, the making of fires was omitted, excepting in wet weather, when small fires were made in the daytime, and the house was opened for ventilation.

June 10th.—Half the crop was fully ripe, and the re-

sidue colored. After the grapes were all cut, the sashes were kept open night and day, and they should be continued so until cool weather, when it will be best to close the sashes and doors at night, to exclude hard frosts.

In July, there is every probability that the red spider may appear on the vines of a house that has been winter-forced; to destroy them, syringe the vines in the afternoon frequently, and dust sulphur all over them; if this does not kill them, wet the flues and the floor of the house thoroughly, and dust both of them well with the sulphur; make a fire in the furnace to cause the sulphur to send out strong fumes; you may melt it, but by no means allow it to burn; shut up the house close, and give it a good steaming; open it early in the morning; this should be done in the afternoon, before the sun has ceased to shine upon the house.

#### GRAPES IN POTS.

Grapes may be grown successfully in pots, proper attention being paid to watering them; doing this judiciously is the most difficult part of the process, as they require an ample supply of moisture, and water in excess will cause the spongioles, around the sides of the pot, to decay, and, if this happens, the crop of fruit will fail. The soil should be rich; sods well rotted, leaf mould, and old cow-manure, with a small quantity of fine charcoal and lime rubbish, will form an excellent compost for this purpose. Air-slacked lime, or leached ashes, can be used instead of the rubbish, if more con-

venient. These materials should be mixed together a few weeks before using, and in these proportions: sods, three parts; leaf mould, two parts; cow-dung, two parts; rubbish, or leached ashes and charcoal, one part. There should be one or two inches of broken pots, stones, or shells, at the bottom, for drainage. A vine in a twelve-inch pot may mature from five to ten bunches. I prefer a wooden box, or the half of a large keg, as the soil is less liable to dry and form into a lump; when this is the case, the water is very apt to run away by the sides of the pot, between these and the soil, leaving the middle of the soil perfectly dry. In the autumn, after a vine has fruited, it should be taken out of the pot and the soil shaken from the roots; with a sharp knife, prune back the longest of these, and repot in fresh compost. During the winter, they must be kept from the frost, and the only care necessary will be to see that the soil has just enough moisture to prevent the roots from drying up. The next summer they must not be fruited, but proper care must be bestowed upon them that they may produce good bearing wood for the year after.

Vines grown by single eyes, or such as would be used for the border, are suitable for planting in pots. You may force these vines to advantage as early as November, if you have a proper temperature.

Liquid manure may be given when the grapes commence swelling off. This may be made as detailed in the experiments on the roots of the vine in bottles, and any of those may be selected for use, as is most convenient, or as may be thought best. If guano is used, four pounds to thirty-three gallons of water is quite strong

enough. A writer in the *Gardener's Chronicle* says, four pounds to twelve gallons; another, one pound to one gallon.

You may train and prune the vines by any of the plans given for the house.

#### RETARDING HOUSE.

The retarding house should be built upon the same plan as the forcing house; it is not necessary that it should be so wide, or so high on the back. [This was written for the first and second editions of this work; the remarks following are now added.] Experience convinces me that fine grapes may be grown in a house of quite small dimensions, yet as a general thing, the largest structures will be more certain to yield the finest fruit. For the retarding house in particular this remark should have weight. This building should be above the sills, 16 feet high on the back wall; 5 feet on the front,  $2\frac{1}{2}$  feet to be solid next the sill,  $2\frac{1}{2}$  glass; windows should be hung so as to air the house. The width from the front to the back sill should be from 10 to 12 feet. These dimensions will give a steep roof, shedding the rain and moisture readily, and admitting the full strength of the sun's rays on to the vines when most wanted, in October, November, and December.

The pruning and training of the vine may be the same as in the cold house; remembering always, that the closer the pruning, the sooner the bud will burst in spring, and consequently ripen its fruit; the reverse is the case with



long spur or cane trimming; the latter is consequently to be pursued to the greatest extent, which the future welfare of the vines will admit of. The thinning of the berries will be performed later than in any other house, and care should be had that it is thoroughly done, and more severely than in any other way of growing them.

Early in March, the sun must be excluded from the house; this can be done by spreading sails, or mats, over the glass; the doors and lights must be open day and night, when the temperature is above freezing.

In May, when the vines push their buds, the covering must be removed from the glass; keep the temperature as low as possible, night and day, during the summer; the end of May, or early in June, the vines should be put to the rods, or trellis.

Early in July, the grapes will be in blossom; apply the sulphur now to the floor of the house, and observe the vines carefully during this and the next month; if the mildew appear on the wood, fruit, or foliage, shut the house at night, and apply more sulphur. Never allow it to remain on the fruit; if, by accident, any should get on, brush it off immediately,—opening the house by day, as in any grapery. Early in August, the grapes will require to be thinned.

In October, when the nights become cool, close the doors and windows, (*where it has not been done before on account of mildew,*) giving as much air, and keeping as low a temperature, (*when the sun shines,*) by day, as possible.

In November, small fires must be made and kept up in the night-time, and in cloudy weather.

In the retarding house, where you cannot prune the vines early, and the close-spur system is pursued, it is best to disbud them; to do this, a sharp knife is necessary, cutting out every eye but the lower one on the spur, being careful not to destroy the leaf; this will throw all the strength of the shoot into the eye which is to produce the fruit the coming season. Care must be had not to perform this too early in the autumn; November, probably, is the best time; if done before the vine is nearly at rest, there might be danger of breaking the eye.

The fruit will be ripe the last of November and in December; after which, the house must be kept as dry as possible, having sufficient fires to keep out the frost.

After the fruit and foliage are off, prune the vines, and protect them from the frost.

[For an extended LIST OF VINES, see page 297.]

#### PROPAGATING NEW KINDS FROM SEED.

If the trial to produce new sorts be persevered with in all sections of this country, unquestionably, varieties will be produced that will be hardy, and, at the same time, free from the hard pulp and foxy flavor, that render the American sorts, in the opinion of most people, inferior to the European.

The Isabella, and generally the kinds that withstand our climate in Massachusetts, blossom fourteen days earlier than the Chasselas, or Early Black July. The Muscat of Alexandria is a few days later still in flowering. To remedy this difficulty, and to obtain the differ-

ent kinds in flower at the same time, resort must be had to retarding the former by some process of shading or of promoting the flowering of the European sorts by protecting them with glass, or some other covering, or the farina may be saved in a tin box, or glass bottle, from the grapery until the vines are in bloom. I have an Isabella in the grapery growing principally for the purpose of impregnation, and I may, one of these days, produce something new from it. This difference of the flowering calls in question the accounts of seedlings having been the result of a natural cross between our native sorts and foreign ones; under usual circumstances, it could not have taken place.

“Mr. Van Mons added a remark which we do not recollect to have met with in horticultural writings, that, by sowing the seeds of new varieties of fruits, we may expect with much greater probability to obtain other new kinds of good quality, than by employing the seeds of the best old established sorts.”—*Hort. Tour., Edinburgh*, 1823.

The *Van Mons* theory is, that, when the seed of a new variety of fruit has been planted, there is less liability to return to the wild state, than when the seed of an old variety has been used, and he advises the sowing the first seeds of the newest varieties of fruits, as the surest method of producing kinds more and more excellent.

Seeds matured by the most healthy and vigorous plants are presumed to be the best for planting, to obtain new kinds. The applying the pollen, or farina, of one variety to the pistil, or stigma, of another, is the surer me-

thod of proceeding to obtain new sorts in the shortest time ; and this is called hybridizing.



FLOWER OF THE GRAPE.\*

To do this properly, the bunch to be acted on should be thinned of three quarters of the buds ; the lower part should be cut away entirely (immediately before inflorescence) ; the strongest buds always to be left.

Observe them closely, and, as soon as the flowers open, with sharp scissors clip the *anthers*, being careful not to injure the pistil ; with a soft brush, apply the pollen from the kind to be used in impregnation, or, the whole bunch which is to furnish the pollen may be cut from the vine, and gently rubbed or applied to the bunch, by

\* The left hand figure is a magnified representation of the bud of the grape ; the middle one is the blossom. The change from the bud to the blossom is usually rapid, and takes place about 30 to 40 days after the shoot appears in the spring which bears the fruit. This bud which forms the blossom consists of a covering, or cap, and the embryo berry with five anthers, which, when the time for inflorescence has come, is raised, or lifted, by the anthers, and the wind blows this cap free.

The third is the blossom, or embryo grape, with the anthers clipped and deprived of their farina ; on the top of the embryo is the pistil ; upon this is to be placed the farina, or pollen, of the male plant ; when this is done, impregnation takes place, and the embryo rapidly swells off. If the operation has not been effectual, the berry will remain as it is. When the grape has attained one third or one half of its size, it remains stationary two or three weeks, and, at this time, it is perfecting the seed. When this is done, the fruit begins growing again ; thus it appears the seed will vegetate, even if the fruit does not ripen sufficiently to be eatable.

frequently striking them together on every side. This should be repeated several days, until it is evident the fruit is all impregnated ; a fresh bunch, with the pollen in a suitable condition, must be had at each operation. The pollen must be dry, and in a falling condition, to be fit for the purpose. If your vines are so situated that a branch to be acted upon can be brought into contact with the branch of another kind, and the bunches interlaced, this will be a good method of proceeding,—cutting away the male part of the blossom from the kind that is to ripen the seed for the new kinds.

To obtain hardy grapes, in new varieties, I should recommend the Catawba, or the Isabella, to be impregnated with the Frontignan, the Black July, the Golden Chasselas, the Pitmaston White Cluster, the Black Hamburg, and Esperione ; a hybrid from any of these would probably be a grape ripening in less time than the first two.

To obtain varieties for the glass-house : the Muscat of Alexandria to be impregnated with any of the kinds that ripen their fruit in a shorter time. A hybrid from any of these would probably have the musk flavor, in some degree ; if the object be to avoid this, some two of the kinds free from this flavor must be selected. The Esperione and Black Hamburgs, being always good setters, are the best for the male plants. The Golden Chasselas, a very beautiful fruit, but often setting poorly, would make a suitable kind to be acted upon. The August Muscat, being very early, could be used as a female also. This variety might be used with the American sorts, with a prospect of producing a plant that would be both hardy and speedy in ripening the

fruit. The Scuppernong, bearing fruit only a few berries in a bunch, is objected to as a parent for a new sort for the greenhouse on that account.

If Mr. Van Mons's system of producing new kinds by seeds from wildlings be attempted, it would be best to try seed from all kinds, the very small, as well as the good-sized berries.

*Insects.*—In Massachusetts, there are but few insects that feed upon the grape leaf. The rose bugs, the past year or two, have been troublesome, and, in some sections of the United States, they are very much so; being sometimes so numerous as to eat, in a few days, every cluster of fruit buds, or of blossoms, upon the vine. The most effectual method of destroying them is by hand; covering them (when wet with dew in the morning,) with wood ashes, or lime is said to answer, repeating the application two or three times. Spreading a cloth over the vine, and filling the space around under this with tobacco smoke, will cause them to fall, when they can be destroyed by pouring suds made from whale-oil soap upon them. When the grape is grown on a small scale, and the rose bugs destroy the blossom, covering the bunch with a gauze bag will be found effectual in staying their ravages.

The large green worm (commonly called the potato worm,) is, in some localities, very injurious later in the season; when in large numbers, it is such a voracious creature it will soon eat all the foliage of a vine. When it is known to be at work, which will be by the leaves being rapidly eaten, all but the stems, it must be sought for and destroyed. It will be found, commonly, on the



under part of the leaf next to the one last eaten ; it is usually of the same color as the leaf, and, unless you observe carefully, it will escape you.

The thrips, small white insects that infest the under side of the leaves, are not so injurious as would seem by the spotted appearance of the leaf. Smoking, or syringing with tobacco-water, will destroy them ; they injure the looks of the vine, giving the foliage a diseased appearance. Wide-mouthed bottles hung amongst the branches, (one every two square feet,) and filled with sweetened water, will collect and destroy large quantities of moths, and other insects. These will require to be emptied every few days, or the dead insects on the surface removed.

In the grapery, the two years past, the common red caterpillar has been exceedingly annoying. The white moth lays its eggs on the under part of the leaf, and the first notice you have of the young is when you discover small spots eaten in the leaf ; on examination, you will now find the young caterpillar, one fourth of an inch in length, spread over the leaves ; you must destroy all you can find at once, and, every day, examine the vine anew ; notwithstanding all this care, some of them will probably escape you, and grow to a good size. If these are very numerous, and are on more than one or two vines, it will be best to fumigate the grapery with tobacco leaves, or stems. This will be necessary, if thrips, or the aphid, or green fly appear in the house. In smoking, care must be had that the foliage is not injured by the heat from the tobacco ; this should be moist, so that it cannot burn with a blaze ; embers and ashes should be placed

upon it, and the tobacco allowed to smoulder, causing smoke and not heat.

• CULTURE IN THE OPEN AIR.

The mildew at the north, and the rot at the south, render the cultivation of foreign varieties of the grape, in the open air, in this country, almost useless. The difficulty is not with the season; this is long enough to ripen many kinds, were it not for the above trouble. I have seen, in my garden, the Early Black July perfectly colored the first of September; but the leaf was so injured by mildew that the grapes did not sweeten, or obtain any flavor.\*

In some of our cities, they occasionally ripen very well. If it is desired to make the attempt, the border should be made with care, in the same way as directed for house culture; they may be trained by any of the systems described; prune them, and thin the berries in the same manner as if in the house.

The Pitmaston White Cluster, Early Black July, Golden Chasselas, and Esperione are recommended as the best for cultivation in the vicinity of Boston; further south, the Black Hamburgh and Frontignans may be added to the list; and south of 40° north latitude, the

\* Application, to the foliage of the vine, of sulphur, in a free manner, is the only effectual remedy of which I can speak practically; other remedies have been recommended, such as lime, ashes, etc., to the soil. Apply the sulphur early in the morning when the leaves are wet, and renew it as often as the rain washes it away.

Muscat of Alexandria and other late sorts may be tried. The August Muscat is the earliest of any grape, and can be tried, as it may be worthy of cultivation when the vine becomes strong.

In November, the vines must be laid down and well covered with straw, or litter, to protect them from the frost, when cultivated in the northern states.

In Hovey's Magazine of Horticulture, vol. 12th, is a communication by Mr. J. W. Russel, gardener to Horace Gray, Esq., on the cultivation of the grape, in which he gives the following receipt to prevent mildew. Having found the application of sulphur to the floor of the house all that was necessary in cultivating the grape under glass, I have never used this preparation, but, for their cultivation in the open air, I would strongly advise its trial; it should be applied in July, or earlier, if there is any appearance of mildew on the fruit, wood or foliage.

*Receipt.*—"To one peck of quick lime, add half a pound of sulphur; put them into a tight barrel, and pour boiling hot water over them sufficient to slake all the lime, and it will be found that the sulphur is mixed with it in the best possible manner; then pour on to the top of it three gallons of soft water, and stir it well together, leaving it to settle; in about twenty-four hours, the water on the top will be perfectly clear.

"This should be taken off as clear as possible, and put into a *stone jar*, there to remain until wanted. Half a pint of this mixture will be sufficient for three gallons of water

"This wash will not injure either the fruit or leaves, and no person could tell that any thing but clean water

had been used, only that it leaves a stain on white paint, which will wear off in a little time. This is a sure remedy for the mildew, and, therefore, worth knowing to every grape cultivator.”\*

The Isabella, a native grape, succeeds better in the open air than any other variety in this vicinity; the border should be well made, and in a dry situation; the training must be different from that of the foreign kinds; it will not bear the severe pruning which is necessary for them; the summer shoots should be tied to the trellis; leading up or out, in different directions, shoots to be partially retained, at the winter pruning, for the extension of the vine. In August or September, cut back the ends of all the shoots made this year to check the growth, and let the sun and air have access to the vine. Winter-prune, in February, on the spur system, leaving addition to the extreme shoots of about two feet of the new wood, and when this cane grows too long for the trellis, cut it back, at the winter pruning, to any length desirable, and lead up a new shoot the coming season to take its place.

The quantity of fruit that a vine of this variety will ripen, when it has arrived at maturity, under proper management, and is favorably situated, is remarkably large; two bunches on a spur may be allowed to ripen; the berries do not require the thinning that foreign ones do; the small ones only should be cut out.

When gathered in perfectly dry weather, and put

\* Prince's Treatise on the Grape contains this receipt, and it is there stated, that the application of it, in the garden of Capt. Smith, of Newport, R. I., to the Chasselas grape, was attended with success. The material part left, after drawing the clear liquid off, may be used for washing the wall, or trellis, upon which the vine is trained.

away in a cool place, just above the freezing point, and packed in layers of cotton, they will often keep good until March. Before packing, each bunch should be examined, and any defective berry cut out.

The Catawba will not ripen as far north as Boston.

Pond's Seedling is one of the best native varieties; the fruit, however, is but seldom seen, and it is therefore presumed to be a shy bearer.

Bland's Virginian will not ripen at the north.

Elsinburgh is too small to be worthy of cultivation

The Ohio grape is tender, and, at the north, requires the same protection as foreign kinds; the bunches are large and long, but the berries very small.

The vineyard cultivation of the native varieties of the grape, in the United States, is attracting more attention yearly. On the banks of the Ohio River, the planting is increasing rapidly, and on the hills near Reading, Pa., are vineyards for the purpose of making wine.

The first attempt to grow the vine in our western country, to any extent, for the purpose of making wine, is generally credited to a party of Swiss, who commenced their operations at Vevay, on the Ohio River. According to Mr. Longworth, it has not been successful. This gentleman is interested in this culture, and by statements of his in Downing's *Fruits and Fruit Trees of America*, he had, in 1845, seventy acres planted with vines and divided into fourteen vineyards, under the management of Germans and Swiss. Mr. Longworth recommends the Catawba as the best variety for the west.\* The Eu-

\* I am informed by the vineyard growers of the grape on the banks of the Ohio, that the Catawba is now regarded as the best wine grape.

ropean kinds have not succeeded with him. The following are his remarks : "The grape requires a good soil, and is benefited by well-rotted manure. For aspect, I prefer the sides of hills, but our native grapes would not succeed well in a *dry* sandy soil, particularly the Catawba. The north sides of *our* hills are the richest, and I believe they will, as our summers are warm, in the majority of seasons, produce the best crops.

"Deep ploughing is the better preparation of the land for the vines. Where a hill is steep, trenching and walling, or sod-terracing, is necessary.

"We generally leave six feet between the rows, and use the plough, setting the plants three to four feet apart, and training them to stakes about six feet high."—*Downing's Fruits and Fruit Trees*, page 251.

It has been considered of sufficient importance to give the views of European cultivators and others, at length, upon the vineyard systems of culture pursued there. The American kinds of the grape, requiring a different plan of pruning, will render many of the practices, particularly the close pruning (in summer,) and planting of the vines, impracticable here ; still, the remarks on manures and soil, and details of some of the plans of training, will be worthy of notice by American grape growers.

First comes the exposition. It is the established opinion, in vineyard culture, that the best fruit is produced where the vine receives the most sun, not upon the fruit, but upon the foliage. Prince says, "Theibaut de Berneaud remarks, that an eastern aspect would be preferable to all others, if it did not expose the plants, during



the first warm days of spring, to be blasted by the burning rays of the sun operating upon the small icicles, each of which acts as a lens. A southern exposure (he continues,) is generally too hot in a warm climate, and a western one is least to be desired, as the plant there receives a direct heat after the early hours of the day have abstracted the moisture, and, therefore, dries and burns it; and he recommends, as a general rule, that, in southern regions, an eastern aspect should have the preference, and, in northern ones, that a southern exposure should be selected."—*Prince's Treatise*, page 46.

Yet there are exceptions to these rules. Vineyards with northern exposures have become celebrated, probably owing to favorable circumstances of soil. In the southern part of the United States, it will be best to try every situation, as the retarding of vegetation a short time might be the means of saving the fruit, either from being destroyed by a late frost, or from excessive rains, at the time of inflorescence, or from rot, caused by too much wet, at a later period.

The plan pursued by American horticulturists in vineyard and garden culture, in some instances in their own language, is described, and as it appears settled from these accounts that our native grapes (different varieties succeeding in various sections of the country,) answer every purpose of vineyard culture, there does not appear to be any occasion to try any others, excepting on a small scale for the dessert.

Mr. Hoare says, "In the choice of a good aspect, therefore, shelter from high winds, and those aspects that are the least exposed to their effects, and that receive

a full portion of the solar rays, may be deemed the best. The best aspects in the southern parts of England are those that range from the eastern to the southeastern, the last of which may be considered the very best. The next best are those which follow in succession from southeast to south. An aspect due south is undoubtedly a very good one, but its exposure to those strong winds which frequently blow from the southwest forms a great drawback. The remaining aspects are those which range successively from due south to due west. These are all good ones provided they are sheltered, or partially so, from the destructive effects of the high winds above mentioned. North of the western point, the maturation of the wood and fruit of the vine becomes uncertain. East by north is a very good one. North of this point, the solar rays are not sufficiently powerful to mature either the wood or fruit.”—*Treatise on the Grape, by Clement Hoare. 1837.*

Chaptal says, “That the middle of a hill side produces the best wine, the upper part the second best, and the bottom of the hill the most inferior;” showing, apparently, that the middle location contains the essential nourishment required, that, in the upper part, there is a lack of this, and at the foot of the hill there is either too much of it, or too much moisture.

Monsieur de la Quintine says of the Muscat grapes, that they “require a temperate country and the expositions of the south and east, and always a light ground; we seldom see any good in pure earth, and, if it be in hot climates, in gravelly and sandy grounds.” Page 229.

The Penny Cyclopædia says of the aspect: "On the steep slopes of hills towards the south, and sheltered from the northeast, the grapes attain the greatest maturity, and the vintage is most certain. So great an influence has a favorable exposure, that in the same vineyard the greatest difference exists between the wine made from one part and that made from another, merely because there is a turn round the hill, and the aspect varies a very few degrees. A change of soil produces a similar effect. The famous Rhine wine, called Johannisbergh, when made from the grapes which grow near the castle, is worth twice as much as that made a few hundred yards farther off. Here both soil and aspect change. The *Clos de Vougeau*, which produces the finest Burgundy, is confined to a few acres; beyond a certain wall, the wine is a common Burgundy, good, but without extraordinary merit."

At Bourdeaux, a southeast exposure is preferred, and in Germany, generally, a southwest; in some places, a northern exposure is thought best, as the danger from late frosts is less.

Chaptal is considered as the best French authority on the vine. His object, in his Treatise on the Grape, was to promote the improvement of the quality of the wine, and to discourage the use of manures, as one of the main causes of this inferiority. The practical ideas of this treatise are mostly attributed to the Abbe Rosier, of whom it is said, "that, retiring to the home of his fathers, he, for a long time, practised agriculture, not only studying all previous systems of vine culture, but comparing the old with his experience, the local practices

with the laws of natural philosophy, to bring the culture of the vine to its highest state of perfection was his particular object." In the introduction, he asks, "Why is it, that so large a number of the wines of France, formerly celebrated, are now fallen into discredit? Why, these wines should be of so ordinary a quality, whilst those of another district have acquired and preserved a merited reputation? On reflection, we cannot attribute the difference entirely to the situation, the climate, or the soil. Is it not, then, to the little care of the cultivators, to the following of a blind routine, or to the ignorance of the laws of nature, or to the preference that is given to vines that abound in juice of a gross nature, above those which produce wines of a better quality?"

Page 6.

"The laws of vegetation, regarding the vine, will show you that a rich soil will produce the most vigorous shoots, but that the sap thus communicated from the vine to the grape would not be sufficiently elaborated; the wine would be insipid and weak. It is necessary to diminish the vigor of the vine to obtain a wine of good quality; to do this, the soil best suited for the purpose must be selected, the best plants, the perfect maturity of the fruit must be attended to, and the most favorable time for the vintage. From chemistry, he must learn the elements of wine, and the manner to direct the fermentation, etc. He must follow *nature*; in all his operations, she should be his study; he should be tractable to her lessons; she alone never deceives." Pages 7 and 8, introduction.

"In France, it is only necessary to cultivate the sheltered hill-sides, and soils granitic and calcareous, or

sandy, and generally the poorest, such as are not suitable for pasture or grain." Page 29.

"The earth, the most suitable for vegetation in general, is that composed of a mixture of flint, of clay, (alumine,) and of lime, in such proportions as readily to imbibe moisture, and so to retain it that it may be constantly and insensibly evaporated by the warmth, giving enough nourishment to the plants until a renewed rain has again filled the reservoirs. When there is too much aridity, the plants become weakened and soon die. To constitute a good vegetative soil, it is not sufficient that barely the top layer of earth shall be thus composed; it must be of good depth." Page 197.

"In time, the good soil will wear out, become exhausted, and one cannot hope to reap a continued advantage, unless by depositing, from time to time, new principles of nourishment,—of oxygen, of hydrogen, and of carbon. These can be found in proper quantities in the manures of animals, and decomposed vegetable matter. One may also usefully employ certain minerals, not as manure, but as a rectifier: for instance, fossils and marl, which, from the effect of moisture and heat, ferment and cause the small lumps of earth to separate, and render the whole mass more permeable to the substances which form the sap." Page 198.

"The nutritive principles required from the soil, for the cultivation of the grape, are the same as those named as requisite for general cultivation; but when there is not a sufficient supply of moisture, the vine will not prosper." Page 219.

"The kind of earth regarded as the most suitable for

the cultivation of the vine varies with the climate in which the culture of this plant is introduced. We do not speak here of the superior layers of soil, which would make such an assertion hazardous. Experience has demonstrated, that, in the southerly (meridionaux) departments, the vine flourishes in volcanic earth, in the (freestone) grit, and in the granitic gravel, mixed with vegetable earth and with some clay, (alumine). Towards the centre of France, they succeed in the schistes, (slaty) and above all in the calcareous rock, which crumbles on exposure to the air. At the north, they prefer the coarse gravel combined with calcareous earth. But everywhere you may make use of collections of earths and stones (almost monstrous,) of all kinds, provided that the mass be permeable to water, and retain but little moisture. All agree that an essential quality for a good earth for the vine, is, that it should possess a mixture of quartz, of flint, and coarse gravel. The rays of the sun penetrate these stones and furnish warmth during the day, and distribute it to the plants by night. This is not all: in earths exceedingly porous, they yet serve, by the effect of their solidity and quantity, to diminish the too rapid evaporation of the moisture. Besides, (finally,) it is by the vegetables that the soil produces that we can best judge of its quality, and of the temperature of the climate. Wherever the cultivator shall see the peach tree prosper naturally, he may conclude the situation is favorable for the culture of the vine." Page 246.\*

\* The mildew, the rot, and the blight, to which all grapes are subject in the United States, more particularly the European kinds, render this remark incorrect, as regards this country.



“If the earth where you propose to plant a vineyard is cultivated already, the best preparation for so doing is to plant, for two or three years, the soil with vegetables, giving the preference to such as require the most working of the land in the cultivation. The labor necessary in this operation, and the manures by which they are made to thrive, prepares, lightens, and enriches it. The dung, in general so adverse to the vine, so prejudicial to the quality of the fruit, incorporated into the soil in advance, can have only good effects ; it has become freed of the carbonic acid in excess, and the vegetable substances become united with the under surface of the earth ; the soil, thus prepared, is suitable for the vine in every age, but more particularly in its infancy.” Page 251.

Remarks quoted by Dr. Lindley in the controversy relating to manures for vines :—

“The same reasons may be used against the system of the vine-growers of the north, who think it advantageous to manure their vines. By this means, indeed, they obtain larger crops, and more wine, but it is of bad quality, it will not keep ; and its smell *often reminds me, when drank, of the disgusting substances which produced it.* Manure communicates to the vine too much nourishment. The nutritious juice, reduced to gas, and received by the mouths of the capillary roots, and by the air-vessels of the leaves, penetrates and circulates in the sap-vessels, forms the wood of the plant, and furnishes the substance out of which the shoots, leaves, flowers, and fruit are developed ; the more abundant the nutritive matter, the more the diameter of the vessels distends, the more rapid

is the circulation of the sap, because the channels through which it passes have more capacity. This causes the sap to circulate in a less state of elaboration, the result of which must be, that the wine is flat, insipid, and destitute of all the principles of alcohol. *Nevertheless, the abundant crop thus obtained, and the brilliant vegetation, are, after all, in some measure deceptive,* FOR THEY CAN BE BUT TRANSITORY. In vineyards where manuring is practised, they only manure once in ten years. It is not to be doubted, that the effect is very remarkable the first three or four years after the manuring of the vines, *but, in the succeeding years, the plants begin to languish;* no longer finding that abundance of nourishment to which they have been accustomed, they suffer in consequence, and often fall victims to the want of it. Thus a part of the plants are lost, either by too much or too little nourishment. But vines can receive, and it is often advantageous to give them, such manure as will make good the poverty of the soil, its exhaustion, or what is required otherwise for this sort of cultivation. No manure suits vines better than what is properly called vegetable earth, obtained by the decomposition of plants. Mosses, leaves, and turf, mixed together, thrown up in great heaps, and left for about two years to ferment, make the very best manure of this sort." Page 333.

These remarks follow the above, quoted by Dr. Lindley, and may be considered essential to the proper understanding of the matter:—

“Nevertheless, as it is often impossible to procure, in sufficient quantities, these (decomposed vegetables,) substances, intelligent cultivators have recourse to such as

can be had from the bottom of rivers, ponds, and ditches, and the sweepings of the roads and streets; these are made up in heaps, composed alternately of a layer of these articles and a layer of old dung from the cow or ox, the horse or sheep. This is left to winter in this condition; it is then spaded over, on all sides, and this is repeated often during a year; after this, it is ready to be applied to the vines. Manures differ in quality, and it cannot be positively said which is best for a place, unless the quality of the earth which is to receive it is known. A manure may be destructive to a vine in one part of a vineyard, and yet be highly invigorating to some other part even of the same vineyard.

“To improve a soil that is too moist, spread gravel upon it; that from ravines is preferable, because it contains a mixture of humus, and shells, and marl, and other calcareous substances. You may also give for manure, ashes, soot, pigeon’s dung, and other powerful substances, but it is necessary that these should be for a long time exposed to the air and reduced to poudrette. These should be mixed with good loam, to render the effect more durable. Where the soil is excessively wet, it will be best to apply manure without any other mixture; in this case, spread a handful of the substance, as you would sow the seed broadcast on the land.

“Vegetable matter alone is sufficient to invigorate, for many years, the vine which has been suffering in poor soil near the top of a declivity. Thus, to manure and improve a soil understandingly, you must be acquainted with the effects of the different manures, and of the pro-

per proportion in which to apply these to the necessities of the different kinds of earth.

“Some cultivators have employed the scrapings of horns, others have made use of the hoofs and feet of sheep, and others, again, of the pieces of woollen clothes.

“All these matters succeed as manures for the vine; they contain much hydrogen and carbon, two of the chief agents in vegetation. Buried in the earth, their decomposition is slow, nearly insensible; but, as it is impossible to obtain these in large quantities, it is not necessary to discuss the effect of them at large; perhaps they may have the effect to give a peculiar taste to the wine.” Pages 335 and 337.

“Fresh dung, the manures obtained from the depositories for carrion, etc., and other powerful matters not yet converted into poudrette, are not the only substances which give a bad taste to the wine. The vine absorbs with much vigor all vapory substances suspended in the air.”—*Traité sur la Culture de la Vigne*, page 340.

The soil of the celebrated vineyards which produce the Constantia wine at the Cape of Good Hope is a decomposed sandstone.

The vineyard of Rudesheim, on the Rhine, is very steep, and is terraced; the soil is of a dark rocky nature.

The soil of Johannisberg, on the Rhine, is argillaceous schist, with a proportion of mica, and, in one place, is a reddish quartz. This is mixed with diluvial and alluvial deposits, in most parts. The exposure is southwest, with a slope of fifteen degrees. The grape generally cultivated near the Rhine is the (Riesling,) White Rissling.

The soil of Leistenwein and Steinwein vineyards, on the Main, is similar, being argillaceous with calcareous portions, especially fragments of lime. The Leistenwein is regarded as the second finest wine of southern Germany; but, as the quantity made is very small, it is seldom to be purchased. The grapes grown here are mostly the White Rissling and the Traminer.

The soil of the hill of the Hermitage, where is made the celebrated wine of this name, is variable. Dr. Bushby says the hill is of considerable height, but not of great extent; the whole front, which looks to the south, may contain three hundred acres, and of this, even the middle region does not produce the finest wines. "The gentleman, whose property we were traversing, pointed out to me the direction in which a belt of calcareous soil crossed the ordinary granitic soil of the mountain, and he said it requires the grapes of these soils to be mixed, in order to produce the finest quality of Hermitage."—*James Bushby, London.*

"Between Chagny and Beaune, in France, the plain lying to the southeast of the range of hills, which, from the value of their produce, give the name of Cote d'Or to the department, is extremely rich, and, to all appearance, capable of yielding golden harvests of corn, as the hills do of wine. The greater portion of it, however, was planted with vines on both sides of the road. Near Chagny, it appeared lighter, with a larger admixture of stones, and, on approaching Beaune, it was a rich brown loam."—*Ibid.*

"At the vineyard of Chambertin, the soil varies extremely, even in the distance of one hundred yards; that

nearest the road is of a brown loam of sufficient consistency, but full of gravel, and, consequently, very friable. The gravel consists of small broken pieces of the whitish limestone, of which the hill is partly formed. At the highest limit to which the ground has been broken up, it is a light-colored clayish-looking soil, with a subsoil of marl and abundance of small shells. Both of these soils effervesced strongly with an acid, but the light-colored evidently contains a far greater proportion of lime. The soils of Beze, another first-rate vineyard of the commune of Gevray, were exactly similar to that of the lower part of Chambertin.”—*Ibid.*

Several other vineyards are described as having the same soil:

Ay, the centre of the district which produces the Champagne wine, is a small town on the river Marne. “The range of hills above the town of Ay is exposed to the full south, except where the exposure is varied by recesses in the range; it consequently produces wine of the finest quality, and very superior to that of Epernay, which is produced on hills exposed to the north. The soil is strongly calcareous, full of small pieces of chalk and of stones. Near the top of the hill, the soil is more argillaceous.”—*Ibid.*

“At Argenteuil, the vignerons pay the utmost attention to their plantations; indeed, their mode of cultivation, at least as relates to productiveness, may be regarded as approaching to the perfection of the art.

“They apply manure very freely; but this practice, though it swells their *recolte*, is thought to deteriorate the quality of the grapes. Poudrette is much used, which is



neither more nor less than night-soil dried and reduced to powder.

“Poudrette, we understand, was first recommended by the celebrated Parmentier, about thirty years ago, (1790,) as a top dressing for various field crops.

“Frequently, it is formed into a compost with the weeds and refuse of the garden, and some marly loam, or light mould; the poudrette being spread on the compost bed, in the proportion of half an inch to six inches of weeds and earth. Such compost is considered as well adapted for stimulating the roots of fruit trees, especially cherries, figs, and vines.

“The offensive smell is, to a considerable degree, removed by the addition of quicklime.”—*Horticultural Tour., Edinburgh, 1823.*

From Abercrombie’s Practical Gardener. London, 1823.

“Although vines will succeed as plants in any common garden earth, it is advisable to allot them a dryish, warm, mellow, unexhausted soil, rich in good loam, or improved with suitable manure, to the depth of three or four feet. A dry bottom is requisite to keep the fruit from degenerating in flavor.”

“Once a week, drainings of the dunghill may be mixed with water, and applied to the roots when the grapes are swelling,” says Abercrombie. And again: “The vine out of doors would not so often make poor returns in fruit, were the soil kept warm and rich by an annual dressing when the plant is at rest. Among the manures found of great avail in supporting or recovering the fertility of vines, may be reckoned rabbit’s dung, duck’s

dung, sheep's dung, sheep's urine, drainings of a common dunghill, vegetable mould, a compost in which warm, dry elements rather preponderate, a little hog's blood, or bullock's blood, or the general offal of a slaughter-house, with a qualifying portion of lime, or shell marl, fresh loam, and sharp sand. Whether it be a fluid manure, or part of the old earth be dug out and a compost substituted, the application is chiefly to be made at the extremity of the roots. The roots of old plants, in a yielding soil, are sometimes found to have traveled to a wonderful distance in quest of nourishment."

In preparing the border for forcing, this author says the materials and proportions should be of "top spit sandy loam from an upland pasture, one third part; unexhausted brown loam from a garden, one fourth part; scrapings of roads, free from clay, and repaired with gravel or slate, one sixth part; vegetable mould, or old tan reduced to earth, or old stable manure, one sixth part; shell marl, or mild lime, one twelfth part. From the time the buds rise, until the fruit is set, manure the border, once in ten days, with the drainings of the dunghill, poured over the roots of the plants.

"The border should be kept, at all times, clear from weeds. When it is necessary to recruit the soil, work in such a compost as has been described, or similar. The dung out of a cow-house, perfectly rotted, is a fine manure for the vine."

Forsyth, in his book on the Culture of Fruit Trees, says that "the best manure for vines is a mixture of vegetable mould, rotten dung, and fresh loam turf; and all this should be thrown in a heap, and frequently turned,

for a year or two, before it is used." Page 219. London, 1824.

The following I found in Loudon's Magazine, vol. 17th, page 646; it is there credited to the Gardener's Chronicle, vol 1st, page 413 :—

"Mr. Hayward's manure for grapes. I have tried a great variety of compounds as food, and have found that one quart of cider, or cider grounds, added to two gallons of water, brings a grape vine to a more perfect prolific state than anything else. This mixture must be supplied in such quantity as will saturate the earth like water to the depth of the roots, and all over the surface occupied by the roots. It must only be given once in the year; and, if repeated the second year, its good effects will be sustained for several years afterwards without farther supplies."

*Hoare.*—"The natural soil which is most congenial to the growth of the vine, etc., is a rich, light, sandy loam, not more than eighteen inches in depth, on a dry bottom of gravel, stones, or rocks.

"Of those manures that may be mixed with the soil when the border is first made, the best are such as possess the two valuable qualities of affording to the roots of the vine *the highest degree of nourishment*, combined with *the greatest permanency of duration*. Of this description are bones, horns and hoofs of cattle, bone dust, the entire carcasses of animals, cuttings of leather, woollen rags, feathers, and hair. Bones, however, on account of their prolonged effect, are by far the most valuable manure that can be deposited in a vine border.

"In the year 1826, several vines were planted. In

the following year, a quantity of bones, the largest of which was the blade bone of a calf, was dug into the border, five or six feet from the wall.

“In the spring of 1833, the border was opened, in order to ascertain to what extent the roots of the vine were nourished by these bones. It was found that the roots had branched out in every possible direction amongst them, the surfaces of which were completely covered with their fibres.

“Bone dust is a very powerful manure, producing immediate effect, and is lasting in its duration.

“Liquid manure is highly valuable, where immediate effect is required. The most powerful are urine, soot-water, blood, the drainings of dungheaps, and soap suds. The first of these, on account of its saline qualities, is better calculated to promote the fertility of the vine than any other liquid.

“For the purpose of top-dressing, and to be forked into the border when requisite, may be named, as highly enriching manures, night-soil, fish, stable manure, and the excrements of every description of birds and animals. It is necessary further to observe, with respect to the application of liquid manures and top dressings, that care must be taken not to make the surface of the border too rich.”

After the vine has become established, Mr. Hoare says: “The winter being the proper time to manure the border, let it now be lightly forked up, and a good coating of manure laid over it about six inches deep, which will answer the two-fold purpose of enriching the border, and protecting the roots of the vine.”

According to Mr. Hoare, grapes may be grown in perfection in England, and to a great extent (by following his directions,) on walls and espaliers, and he gives a scale of measurement of the vine, by which to regulate the crop, as follows : A vine of three inches in circumference may bear five pounds ; a vine of three and a half inches in circumference may bear ten pounds ; and advancing in this ratio to ten inches circumference, and, for every half inch of increase, allowing the vine to ripen five pounds additional of fruit, so that the highest number will give a yield of seventy-five pounds. If this can be done, and he tells us that he gives the result of his practice, it would seem that the question was settled. But it appears that there are those holding different opinions. In the *Gardeners' Chronicle* of June 10th, 1847, is the following, on an article relative to planting the banks of railways with vines :—

“ We entertain no doubt that *some* of the traditions current in this country, as to vineyards having once been profitable, are true, although others are apocryphal ; but we altogether disbelieve the statement that the wines of England were ever of good, or even tolerable, quality.

“ Upon all such points, we have to depend upon assertions, whose value cannot now be determined, and a question like that of vineyard cultivation in England must be decided upon better grounds than tradition, and the reports of persons whose taste was wholly unlike our own. The fact evidently is, that, where nations had very bad internal communications, and slow and difficult commercial relations, it was necessary that objects of general consumption should be made in every possible place ;

especially a commodity so heavy, bulky, and difficult of transport as wine. This, we conceive, quite accounts for the numerous attempts that were formerly made to obtain wine in the north of Europe, and for what is called the success attending such endeavors. But, as communications between country and country became easy, such a necessity ceased to exist; people's taste, moreover, became refined, and, by degrees, all such cultivation as that of the vine, in English vineyards, was discontinued. If this was not the reason of vineyards being abandoned, we are at a loss to know what it could have been. It would hardly have been abandoned, if profitable; and, if it was unprofitable formerly, how much more so must it be at the present day.

“But it is alleged, that an ‘improved climate, greater skill in cultivation, and general advancement in science,’ would cause vines to be grown to higher perfection in England now than formerly. May be; not that we know any thing of the alleged improvement in climate. No one can have greater respect for the skill of English gardeners than we have; we are perfectly ready to recognize the claims of science, and the advantages that have attended its application to rural economy; but there are things which neither horticultural skill nor science can effect: and among them is included an exercise of control over seasons. We cannot raise the temperature of our summer the minutest fraction of a degree; we cannot increase the heating power of the solar rays; we cannot prolong their period of action; in short, we cannot give Kent the climate even of Normandy. And



yet we must do all these things if we would grow wine as good as even that of the environs of Paris.

“The fact is, that the vine cannot be profitably cultivated in vineyards beyond 50° north latitude, and only so high as that latitude in very favorable inland situations.

“Great Britain is, therefore, wholly beyond its limits. In saying this, we by no means intend to assert that, by the selection of such inferior but early varieties as the Black Cluster, or Miller’s Burgundy, (not Black Muscadine,) grapes cannot sometimes be imperfectly ripened in vineyards in England; no doubt they sometimes will come to that sort of maturity which persons, who do not distinguish correctly between sugar and vinegar, are accustomed to call ripeness; as for example last year. But we have no hesitation in expressing a decided opinion that to expect a profit from ripe grapes in English vineyards, on even an average of years, is hopeless.”—*Gardeners’ Chronicle*, 1847, page 403.

Trowell, Chapter on the Vine, page 91, says: “They require a light sandy ground to be planted in; if it is a little stony, it will thrive in it, if lying to the south, or southeast, and if the bottom is chalky or gravelly under the surface, where no springs are. It cannot be well too hot or dry, if it is not addicted to heath; but if brambles, it is a good sign. Where that shrub grows, such a ground is the most proper for a vineyard; and the declivity of a hill still better.”

Thus much for the situation and soil in the natural state. He then goes on to say: “If your land is too rich, it only permits the roots to shoot out the branches

and leaves, but less fruit; the barren does not admit the roots to be so luxuriant, neither do they enter the earth so deep, by which means they spread more towards the surface, and so give the tender fibrous roots the benefit of receiving the natural sweet and gentle showers, dews, &c., which imparts a pregnancy to this plant, and do receive the cherishing warmth of the sun, and is more impregnated with the volatile salts, which is drunk by the delicate pores and apertures of the latent roots, whilst those buried deeper are deprived of that benefit, and grow only fertile in watery and insipid leaves without fruit, and produces long and unbearing branches, whose joints admit of no produce; whereas the other will produce fruitful joints, being very short, like to a joint of a man's finger, which are the bearing branches. Now when you plant your vineyard, let it be east and west, for the other position, north and south, is not so good.

“When you plant, dig your trench near a foot deep, and about a yard asunder, for the more ease of going between them to do the necessary work that is required in the several seasons of the year; then set your plants,—let them be about a cubit long, having three or four eyes of the young wood on them; then plant them in the bottom of the trench, a little sloping; when done, cover them three or four inches with the mould; then level your ridges, that your sets may just appear above the surface; plant your sets something more than two feet from each other; after this, strew some of the manure along the ridges, not too thick, which will preserve them. Keep them weeded and hoed; when they begin to shoot, then set your props, of what wood you please, of about

four feet in length, and the thickness of a common broomstick, placed on the north side of the plant."

After giving directions for pruning, etc., for the first three years, he says, at the fourth year, your "plants may be expected to bear a quantity of fruit; then you may leave three or four shoots to each plant, with about four eyes; but, when older, you may leave six or more from a strong root.

"Now when your vineyards want amendment, as all lands will, strew some of the manure (liveings,) on the ridges and about the ground between the rows, in the month of November. Use no more than sixteen bushels of the manure to an acre.

"Now as to vines planted against a wall, pale, or house, you may keep them to what height you please, as the place will permit, etc. When your vine that is planted against your walls, house, &c., wants refreshment, you may water it with about two quarts of the lixivium of the manure, when the vine begins to put forth; you may do the same about midsummer, when the grapes are small; all which invigorates the roots of your vines, and makes them yield a much greater plenty of fruit."—*New Treatise of Gardening, by Samuel Trowell. London, 1739.*

The varieties Trowell mentions as cultivated in the vineyard are Burgundy, Champagne, and Frontiniack, what we now know, probably, as the small black grapes like Miller's Burgundy, White Sweetwater, and Frontignan.

The manure spoken of here is described as a very concentrated substance, equal in strength to guano.

“When a vine is to be first established on any spot where none grew before, the first thing is to prepare the ground for planting. In steep places, where the soil might be carried away by rains in winter, or spring, terraces are formed by building massive stone walls along the slope, and levelling the soil behind them. The walls serve to reflect the heat, and form a shelter to the vine below. Thus a whole hill is sometimes covered with terraces from top to bottom, and there the wine is generally good, if the exposure is favorable. Limestone, gravel, or coarse sand, with a small mixture of clay, forms a good soil for a vine; vegetable substances alone should be used to enrich it, such as the leaves and tendrils of the vine, the residue of the grape when pressed, and, failing these, the leaves of trees collected when green and formed into a compost with earth. The ground should be well trenched, if it will admit of it, or loosened with the mattock and pickaxe. The different parts of the soil should be intimately mixed, keeping some fine soil at top to set the plants in. When the ground is prepared, holes are dug in rows four or five feet wide, at the same distance from each other, so as to alternate; some of the finest of the soil is put into each hole, and the vine plants, which have been rooted in a nursery, or else simple cuttings, are carefully inserted, pressing the mould round the roots, and levelling the earth. Rooted plants will bear the second or third year, but cuttings take a much longer time. The usual instrument of tillage in stony and rocky soils is a two-pronged fork fixed in a short handle, at an angle less than a right angle with the prongs, which are a foot long, and very strong, like

a double pickaxe. This is struck into the ground, and then drawn towards the workman, while the handle is lifted, which acts as a lever in raising the soil. The next year, it is usual to prune the young vine down to one, or, at most, two eyes or buds; but some experienced vine-dressers recommend deferring this operation to the second year, by which, although the vine will not be so forward in fruiting, it will be much strengthened, and fully repay the apparent loss of time in the end. In the third year, the vine is trained; that is, the shoots are tied to upright stakes planted at each root, or they are laid in an arch and tied from one root to another along the ground.\*

“When vineyards are established in the plains, where, sometimes, as those of Medoc, they produce very good wine, the intervals between the plants can be stirred by the plough, although forking and digging by hand is more common; hoeing is as necessary in a vineyard to destroy weeds, as it is in a field of turnips, or any other crop sown in rows. The pruning of a vine in bearing, the object of which is to produce much fruit without weakening the plant, can only be learnt by experience and practice; much of the success of a vineyard depends on this operation. In the best vineyards, no manure is used, except that which we mentioned before, of leaves and tendrils; but some soils require to be recruited, and, without manure, would produce little or no wine. In this case, there is no alternative, and composts must be formed, as is done in common cultivation, with animal and vegetable substances mixed and decomposed. Horse

\* This mode of training is by no means universal, but is common in France, and in the vicinity of the Rhine.

dung should be avoided, if possible;\* cow dung is cooler and more nearly of a vegetable nature; this should be mixed with as much virgin earth from pastures and meadows as can be procured, and laid in small heaps in the intervals between the rows. It may be left a little while, if it has any rank smell, and then forked in round the roots; the more it is decomposed the better. Many a vineyard has lost its reputation after having been abundantly manured. The Johannisbergh was much reduced in value, after having been dunged, while in the possession of General Kellerman. After a certain time, which differs in different situations, the vine becomes less productive from the exhaustion of the soil, as is the case when the same crops are repeatedly sown in the same ground; this depends on the depth of the soil. All perennial plants shoot out their roots farther and farther every year in search of fresh earth, and it is by this means that trees flourish for a long time on the same spot; but if the roots are prevented from spreading, or the plants being too crowded, their roots interfere, a diminution of vigor is the consequence. So it is with the vine. In this case, the remedy is the same as for land bearing corn. A rest is necessary, together with the addition of such manure as shall restore the lost fertility."

—*Penny Cyclopædia*.

The superior quality of wines from celebrated vineyards, where, it is said, no manure is ever used, is, in some measure, owing to the limiting the amount of fruit

\* If the soil is stiff, horse dung is more suitable than cow, and, when old and decayed, is no more heating.



which a vine is allowed to mature, and to the great care bestowed in the cultivation,—as pruning, and keeping the soil constantly worked and loose, and in harvesting the grapes, being careful not to gather any but what are perfectly ripe, and never allowing any defective berries to be put in the press (which, in common wine-making, usually receives but little attention, all, sound and defective, often going into the press together). At Johannesburg, the vineyard is surrounded by a stone wall ten feet high, thus promoting the ripening of the fruit.

“Some local influences produce effects which are alike inexplicable and inimitable. These, though generally attributed to the soil, are not always or solely owing to its composition and qualities. In some instances, the soil is the main cause of difference, as seen in the Constantia of the Cape. The climate there is most favorable to the growth of the vine; yet, in one small space only, is a tolerable wine produced; the two contiguous farms of the great and little *Constantia* yielding, the former the red sweet wine, the latter the White Constantia: the soil on which they grow is decomposed sandstone.”—*Penny Cyclopædia*.

“The Montillado, of Spain, is the produce of a white soil, containing seventy per cent. of carbonate of lime, with alumina, silica, and a little magnesia, while the Mandanilla is the produce of the red and sandy earths; yet the wines do not greatly differ in taste or flavor. More importance is attached to the soil than it deserves; its physical properties are of more importance than its chemical. Chaptal was clearly of this opinion, for he

maintains that, provided it is porous, free, and light, its component parts are of little consequence.

“Where some peculiar strong-smelling substance exists in the soil, an odor is communicated to the wine which renders it unpleasant. This is the case when stinkstein (a variety of sub-carbonate of lime, called *pierre puante*,) is present. Even wine tainted with this, though at first repulsive, is ultimately relished. The vine-growers of France and Portugal have so strong an aversion to manuring the vines, from the notion that it deteriorates the flavor of the wine, that, in the latter country, at least in the port-yielding district of the Alto Douro, the use of manure is forbidden by law. This seems to be a prejudice, for the German cultivators manure the vines very freely, and no wines are more esteemed for *bouquet* than those of the Rhine; and Brown-er justifies the practice, not only with fresh cow dung, but with pieces of woollen cloth steeped in liquid manure and dried, which is found greatly to augment the produce. Professor Rau bears testimony to its utility. Even the proprietors of the vineyards near Bourdeaux, which produce the highly-prized clarets, employ manure once every four or five years. But the same vines will yield a wine having very different qualities, at least as to flavor and perfume, in different seasons.

“The color of any wine is not dependent on the color of the grape from which it is prepared. Champagne is the produce of a red grape. The coloring principle resides entirely in the skin, except in the Tentilla, (the French *Teinturier*, or l’Alicant,) which is entirely penetrated by the coloring principle.”—*Ibid.*

Dr. Bushby says that in Spain they vary, as in other countries, in the practice of manuring vines. At a vineyard in the environs of Xeres, he says: "There was a dunghill of fresh horse dung collected outside the vineyard, and though we were uncertain whether we understood each other's meaning, we supposed him to say that they manured each plant annually." At another, he says: "The vines are regularly manured with any kind of dung, in general, strong stable dung; not every year, because, said the vinador who accompanied us, they could not procure it." At some vineyards, he makes no mention of the practice at all; at some, they manure once in four or five years, and say that is often enough.

In France, Dr. Bushby states the same general practice; at some vineyards, he was told that they never manured the vines; at others, for instance, under date of Montpellier, he says: "Notwithstanding the apparent richness of the soil, I observed them everywhere digging in large quantities of dung, and this, as well as the mode of pruning, indicated that they were more anxious for the quantity, than the quality, of the produce. The wines of this district are almost universally converted into brandy."

All the small proprietors manure their vines with strong stable dung; they make no distinction, using that of horses and that of cows.

It would appear that the question, Are vineyards manured? might be put to rest as an established fact that they are. Unquestionably, there are places where nothing but loam and vegetable substances are used for this purpose. But, from the observations of travellers,

and the writings of agriculturists, and from my own observation, I have no doubt of the fact. In many of the grape countries of Europe, manure is so valuable, that, by the road sides, and in the villages, women and children are frequently on the lookout for the droppings from the post and other horses that may be passing by. Many a time have I seen eight or ten women, scrabbling for this purpose, come very near a pitched battle. In Switzerland, and parts of Germany, as well as in some parts of France, also, the farmers have, next the road, in front of their houses, a large hole, or tank, dug in the earth, into which is thrown the manure and all the refuse matter of every kind, solid and liquid; the solid matter is heaped up in the middle; the rainwater is led into this hole from the vicinity, and this liquid is carried, by women, in large buckets strapped to their backs, and spread broadcast over the land. This I have seen applied in wet weather, not only to grass land, but to vineyards and other crops,—a practice more beneficial to the land, than agreeable to the traveller.

A story of a grape grower, who had become so poor that he could give but little manure to his vineyard, has been circulated within a few years, and is often referred to, verbally, as proof of the uselessness of the practice. The account went on to say, that, finally, having no manure at all, as the yield of the vineyard was less and less, from the constantly diminished quantity of manure given to the vines, and he becoming poorer and poorer in consequence, being almost in despair at the prospect of starvation for himself and family, the thought occurred to him that the trimmings of the vines might be of service;

accordingly, the young shoots and leaves were cut into pieces and dug into the earth. The result of this application was a fine yield of fruit. I do not question the correctness of this story: it is not improbable. But, in my estimation, it is proof of the correctness of some of my statements regarding manures, and is evidence of the importance of rich soil, and, at the same time, is admitting the fact of the practice of manuring vineyards, for it was the deficiency of the manure which caused this vineyard to give fruit in a less quantity, when it had been accustomed to this annual stimulant. According to the story, the vines, at last, almost ceased to bear fruit; as this occurred the year previous to the manuring the land with the trimmings of the grape, it is not unreasonable to suppose that, by this cessation, the plants were strengthened, and enabled, the coming spring, to show a good crop; and, having been kept without any stimulant the year previous, and but little, if any, the year before that, this application, at midsummer, just at the moment when the juices being washed to the roots by the rains at this most suitable time, would have the most beneficial effect. It is, unquestionably, evidence of the value of the trimmings of the vine, but, also, at the same time, of the value of manures.

If I were about to locate a vineyard, a good loam should be sought; one that is readily worked, and made permeable to the effects of sun and air. If it were of a clayey nature, the incorporating of a good proportion of shells, old lime rubbish and bricks, bones, and charcoal screenings would improve it, using all, or only part of the substances, as they are more or less difficult to ob-

tain. If it is intended to form a vineyard on a gravelly hill, or other spot with such soil, I would use, of these, bones and charcoal, and as much loam from an old pasture, which had been enriched for years by the droppings of sheep and cattle, as could be obtained. If none of the articles above named, for the purpose of keeping the earth loose, can be had, other, the best substitute, must be used; vegetable mould, leaves, straw, shavings, and chips of wood, &c., are suitable.

With regard to manures for enriching the land, I would have a compost heap prepared, into which should be incorporated, with reference to the ease of obtaining them, any and every article of animal or vegetable matter capable of decomposition. In applying them to the land, the condition of the soil must be taken into consideration, giving more or less according to its richness, or the reverse. The purpose for which the grapes are to be grown must be considered; if for dessert more nourishment will be required; if for wine, a less quantity will answer.

After a vineyard has become established, (which will be in five years, according to Chaptal,) if manures are scarce, they may be more economically used by spreading and digging them in, when new; but it is necessary to be cautious in applying new and raw manures to all fruit-bearing plants; inexperienced persons should never apply any but manures from the compost heap, or that have been meliorated by age. If guano is to be used, it is safer to do so by forming a mixture with this and vegetable mould, or loam. As a liquid manure, it is serviceable, using four pounds, at most, to a barrel of water



The grape vine requires from four to six months, according to the kinds, to perfect its fruit. (See August Muscat.) Where the season is free from severe frosts this length of time, and there are no other obstacles, as mildew, blight, &c., the vine may be cultivated. In hot climates, near the equator, there is too much rain; and, were it not for this trouble, it is not likely the vine would succeed, as it requires a season of rest, and enough of cold to cause the leaves to fall.

“The same latitude does not always allow the grape to ripen its fruit in an equal degree of perfection. The south of England has the same latitude with some of the vineyards on and near the Rhine which give good wine; but the greater humidity and obscuration of the sun prevent the ripening of the fruit, and the observations of Dr. Daubeny have proved that the ripening of fruits depends more on the illuminating rays than on the calorific or chemical rays.”

*Planting the Vines.*—If rooted vines are to be planted in the vineyard, this operation may be performed at the most convenient time after the fall of the leaf, and the ground is in a good working condition. It should be done with care, spreading the roots cautiously out. If scions of the vine are to be planted, and where the frosts are not very severe, they may be put, immediately on cutting, into the earth where they are to remain. If it is considered necessary to guard them, during the winter, from the frost, they should then be put into boxes with sand or coarse earth, and kept in a cool place, just above the freezing point, and then plant them out as early in the spring as possible.

*The system of Pruning and Training the American varieties of the Grape, in gardens, on houses, and in vineyards.*—The American varieties of the grape require very different *summer* treatment from the European kinds. The system of training them which I should recommend as the best, is the one Speechly advises for espaliers. It is having eight upright canes permanently established, instead of one, as advised by myself, for the grapery.

The vine is to be established in this form, by the same process as Mr. Hoare gives for his, (see Hoare's plan,) and is, in fact, restoring this to its original and most judicious system. After it has once become established, the fall or winter pruning will only be to cut back the present year's wood to the spur, leaving one or two eyes, as you may think best.

This plan is illustrated by a view of some vines trained as above described, and represented as in full growth in summer. The only pruning recommended for the summer, is to stop the leading, or any other shoot that may be growing too strong, and thereby weakening the growth of the lower limbs. In August or September, stop the shoots by cutting or pinching off their ends. The foliage is liable to be injured by blight in some sections of the country; as a remedy for this evil, promote a good stock as a reserve. After the fruit is set, and is as large as peas, it will be time to tie the shoots into the trellis. In the view, it will be observed that this has upright pieces three feet apart; the shoots from the spurs can be secured to these, or lighter supports may be placed halfway between them for this purpose.

A vine should be six or eight years old before it be allowed to cover so much wall as represented in the cut. The first year of bearing, these upright shoots may be pruned to about six feet, permitting them to extend themselves two feet every year, until the wall is covered. If the spurs are too close together, some of them must be pruned out, so that every spur and shoot shall have ample room. The shoot on the top spur, when the wall is full, may be led along the top of the trellis till it has grown five or six feet, when it can be pruned back to about three feet, leaving the lateral to grow, which can be stopped, if it grows too strong, in two or three weeks; if not, let it grow till the shoots are stopped in September. In the winter pruning, this must be cut back, as are the other shoots, to the one or two eyes.

This trellis is made with three horizontal pieces of boards, two inches wide by one and a quarter thick. The first one is fifteen inches from the ground, the second in the middle, and the third near the roof; these are secured firmly, fourteen inches from the house, by board cleats, quite stout, which are nailed to the trellis and house. On these horizontal pieces are nailed the upright ones; they should be one inch thick by two inches wide, eight of them to a vine; the distance between them should be three feet from centre to centre. The lower, or horizontal limbs of the vine, must be trained to the lower horizontal strip, and the upright branches trained one to each upright piece, and well secured by tying. (See cut.)

R. T. Underhill, M.D., of the city of New York, has a vineyard on the Hudson, where he raises large quan-

tities of the Isabella and Catawba for the table, which are sent to the New York market for sale.

January 17th, 1842.—This gentleman wrote an account of his vineyard, for the "Orchardist's Companion," in which he states, "that he has been, for more than ten years, extensively engaged in the cultivation of some of our native grapes." At this time he considered the Isabella and Catawba the preferable kinds for cultivation. Under date of February 22d, 1848, he writes me, that he is still of this opinion, and "that he is experimenting with some other varieties, but, at present, I am not prepared to give any native vine I have ever tried, a preference over *them*. I have twenty acres of these grapes under successful cultivation, and am making preparation for putting out four acres more, the coming spring. I plant on the side of hills and level surfaces; either answer equally well in this climate.\* The mildew, which was, at a former period, troublesome, has, with the generally improved character and quality of the fruit, disappeared. They do not suffer from the rot, save in confined situations, during very warm, rainy seasons. My Isabella grapes, which have improved so much in quality by cultivation, during the past twelve years, mature earlier, and are far less subject to injury from climate or other causes, than formerly. Indeed, an Isabella grape vineyard properly planted, with acclimated vines, and cultivated as they should be, will, in this *climate*, give a more certain annual crop than Indian corn."

In the communication to the above publication, I find

\* Hudson River, State of New York.

Dr. Underhill has more fully expressed his opinion as to the improvement in the quality of the Isabella and Catawba, which were growing in the wild state about forty years since, (time of writing 1842.) He says, "the quality of my fruit has changed very much within a few years; the clusters and berries are much larger and sweeter, the skin thinner, and the *pulp has nearly disappeared*. But I do not wish to be understood as conveying the idea that others, having a suitable situation, and good vines, with properly directed efforts in planting, pruning, &c., cannot succeed in raising as fine fruit as grows upon Croton Point."

The native grâpes of Massachusetts do not improve by cultivation upon removal to the garden; the bunch and berry can be enlarged, but the strong foxy flavor still remains, which renders them unsuited for the dessert.

The improvement in the quality of the Isabella and Catawba, spoken of by Dr. Underhill, under his cultivation, is, no doubt, owing to suitable soil and judicious cropping. In its wild state, this fruit would be taxed to its utmost, in its efforts to mature the abundant crop which it naturally produces; consequently, the fruit would be small, and the flavor deficient.

Under cultivation, one quarter of the fruit which the vine would set, is as much as it would be allowed to mature. This would enlarge the bunch and the berry, and hasten the period of maturation, and improve the flavor. I believe it is generally admitted to be the case, with all fruit trees, that a small or limited crop is the highest flavored.

The summer of 1847 was an unpropitious one for

grapes, in the open air, in Massachusetts, the fruit ripening on but very few vines. On vines exposed to the due south, where the soil was dry, or well drained, the fruit ripened when the vines were judiciously pruned, and curtailed of their over-abundance of fruit; in wet situations, it failed entirely.

The effect of a warm, dry soil, is to cause the sap to rise, and the shoots to put forth early in the spring, and generally influencing the early ripening of the fruit. This fact, when acted upon, in situations where the climate is sufficiently mild, can be made of service in lengthening the season for this fruit; as, by planting vines in wet situations also, you will have a succession of fruit.

H. W. S. Cleveland, Esq., of Burlington, N. J., has a vineyard of the Isabella, and is increasing it largely.

The following is Mr. Cleveland's account of his vineyard, furnished me for publication, at my request:—

“ My vineyard comprises between two and three acres, and is situated on the south side of the Delaware River, one mile above Burlington. The land is level, and is a rich mellow loam. The vines were planted by the former proprietors of the farm, in 1840, and I am told, by a laborer, who assisted in planting them, that there was no other preparation of the soil than deep ploughing. Some of the vines are now ten inches in circumference at the surface of the ground. The rows of vines are eight feet apart, and the vines sixteen feet apart in the rows. They are trained on trellises six feet high, the posts of which are eight feet apart, and the lowest slat of the trellis two feet from the ground, the next four, and



the next six. Part of the trellis is made of latn, an inch thick and two inches wide, and part with No. 12 wire. The latter is decidedly best. It costs, in the first place, but half as much as the lath, will, no doubt, last much longer, makes less shade, and saves much labor of tying up the vines, as the tendrils seize upon the wires, and save the necessity of strings. My plan of training is, to lay in a shoot from each vine on each side, to meet the corresponding one from the next vine, on the lower slat, and, as the vine becomes stronger, two more in the same way, on the next slat. These are never cut out, and the fruiting shoots are grown on this old wood, raising new ones every year, and cutting out those which have borne. I begin pruning as soon as the leaves fall, and work at it in all mild weather, through the winter. I have pruned, in every week, from twentieth October till tenth of March, and never have been able, with the most careful observation, to perceive any difference in the time of starting, or the vigor and health of the vine or fruit. The late pruned ones are certainly more liable to bleed, but, if the bleeding hurts them, the injury is not yet perceptible on my vines. I leave from three to five buds on my fruiting shoots, according to their strength. More than half the vines in this vineyard are Isabella, the rest are Catawba, Elsinboro, Black Madeira, Norton's Seedling, and one or two other inferior kinds, which I do not know. The Isabella is the most certain. The Catawba I think the finest grape, but it is much more liable to rot and mildew than the Isabella. Twenty pounds to a vine is a fair crop for either of these. The Elsinboro is very highly esteemed in this vicinity. Its size is that of a

large pea, and the seeds are large, but its flavor is pleasant, the pulp melting, and it has less of the foxy flavor than any of our native grapes. The grape which I have called the Black Madeira, I am inclined to think, must be the Lenoir. A gardener, who worked for the former owner of my farm, told me it was 'Black Madeira,'—but I can find no description of such a grape, and it certainly is not 'Bland's Madeira,' which is but a synonyme of the Alexander. Downing's description of the Lenoir, answers to the grape which I have called Black Madeira. It ripens a week or ten days before the Isabella, and is a sweeter grape. Norton's Seedling is third rate with us; it bears well, and ripens well, but is foxy and sour.

"I planted a new vineyard last spring, (1847,) near my old one, and on a similar soil, though the ground has a very gentle slope to the southwest. Six months previously, I advertised, in our village paper, for bones and refuse animal matter of every description, which set the boys to collecting them, and before spring I had procured about three tons. I had a pit prepared, in which they were thrown, and every fresh deposit immediately covered with old sod, of which I had collected a great quantity, from along fences, &c., before the ground froze. The field where my vines were to be planted, had been in clover the previous year, and all the second crop of the clover had been suffered to die on the ground. As soon as the ground would do to plough, I spread the contents of the pit, bones, sods, &c., as evenly as possible over the ground, breaking the skulls and largest bones with a sledge. I then run a furrow across the field, as deep as the plough could go, and then another plough in the

same furrow, which threw out the sub-soil to the depth of sixteen inches. The first plough then commenced a second furrow, and of course turned the slice of sward, with the bones on it, into the bottom of the first, and the second plough then threw the sub-soil over it, and so on till the whole field was thus trenched. The vines were then planted in rows, six feet apart, except that between every third and fourth row a space of nine feet was left, to admit a cart with manure. These vines were put but six feet apart in the rows.

“*Grafting Vines.*—In December, 1843, being about planting a quantity of foreign vines, in a green-house which was built by the former owner of the farm, it occurred to me that I might get fruit sooner, if I could graft upon old vines. The difficulty was in removing the old vines. I had some Isabella vines of four years old, which I had been obliged to remove the year before, and these I judged best to make the attempt with. I took twelve of them, not one of which was less than an inch in diameter, at the surface of the ground, and in taking them from the ground I used the greatest care to preserve every root. I first took a trowel and dug down beside the vine, till I came to a root, and then followed it out to its extremity, and then went to the next root, and so on, so that I was sometimes an hour digging up a single vine. I then planted them outside the house, carried the stem to the inside, under ground, sawed it off two or three inches below the surface, split the stock, and inserted two scions in each, pressed the earth as tight as possible about them, and so left them. Some of them, however, were left till March before grafting, but I did not per-

ceive any difference in their growth. As soon as the eyes had pushed enough to be tied, I pulled out the scion which had the weakest shoot, and trained the other up under the rafters. They all grew that season to the top of the roof, fourteen feet, and were there stopped. In the fall, there were ten of them which I judged to be stout enough for fruit, and I cut them down to five buds each. They bore, and ripened their fruit well, and have continued to bear, more and more, the two seasons since. I allowed one, the past season, to bear twenty pounds, which was too much, and it was not well colored. The rest bore about twelve pounds each, and ripened it well. Two of them made rather long-jointed wood the first season, and were cut down to one bud in the fall, and the next season one of the shoots from one of these buds got broken off by accident, and I immediately cut off the stem, under ground, and grafted a second scion into the first. This was in June. It grew perfectly well, and has fruited for two seasons past. The kinds I engrafted were the Black Hamburgh, Victoria, Black Prince, and White Sweetwater. I have been unable to perceive any difference between the size, color, and flavor of the fruit, from that of the vines on their own stocks.

“The insects which breed in our light soil, are a great trouble here. The rose-bugs attack them while in blossom, and, unless a direct attack is made upon them, they soon destroy a large crop of bloom. I have boys with tin cups, with a little spirits of turpentine in them, who go through the vineyards every morning, during the three weeks or thereabouts, that this bug exists, collecting them into these cups, where they are instantly killed.

I have been troubled with a worm, which gets in the grape when ripe, and often destroys a whole bunch, boring from one berry to another. It is a little grey maggot, about one eighth of an inch in length. In the vineyard formed last spring, I planted three thousand vines, all Isabellas. Formerly, I used to be careful in my summer pruning, but after experiment, I was convinced that the vines are best let alone, as the leaves got so much injured by storms and insects, that all that are left are needed for ripening the fruit. I therefore train up the growing shoots to the trellis, and as the side-shoots and stragglers push out, so as to be in the way, I simply trim them off with a pair of hedge shears.

"I have been carrying out the plan I told you of last fall,—the covering of the ground of my vineyard with tan, shavings, and pine leaves, and the advantages expected to be derived from it are as follows: that it will keep the weeds from growing, and save the necessity of ploughing; it will prevent the lower bunches of grapes from getting spattered with the earth, when it rains, which has always been a serious trouble when the earth was kept loose by ploughing; it will keep the earth cool, and prevent an early starting of the buds, which sometimes causes serious loss from late frosts; and, lastly I hope it may prove, in some degree, a guard against those insects which breed in the ground, and are most formidable enemies.

"HORACE W. S. CLEVELAND.\*

"*Oatlands, Burlington, 1848.*"

\* This gentleman has been so troubled by a small green worm, which infested the bunches of grapes, that he has almost given up the cultivation in the open ground. 1852.

In a subsequent letter, Mr. Cleveland writes: "We are daily fighting rose-bugs, which made their appearance on the twenty-fifth May, but in that part of the vineyard the ground of which I covered, very few are yet to be found, though they have heretofore always been most numerous there."

The fruit in the above vineyard is grown for the dessert. The amount of twenty pounds per vine, where the plants are so wide asunder, appears to me to be a small crop for vines seven or eight years old, of the Isabella or Catawba varieties. It is unquestionably, a good plan to limit the plant to this quantity when young, and no one can judge so well, what a vine is capable of producing, without injury, as the one having it in charge.

*Culture of the Grape in North Carolina.*—The following is a condensed account of the grape culture in North Carolina, originally written for the November number of De Bow's Commercial Review, by Dr. Sidney Weller, of North Carolina:—

"North Carolina is ahead of all her sister states, in the wine product, by some thousands of gallons, according to the agricultural census of 1840; and, as far as I know, my vineyard is the largest in this state, and, I suppose, in the south, and perhaps the most productive; since, besides entertaining hundreds of visitors, and disposing of quantities of grapes carried away, I made, last vintage, forty barrels of wine. My increase of product has been, annually, for a few years past, about ten barrels.

"Of our native Scuppernong, the grape for the south, I make wines that readily bring me, in different markets, \$1 to \$4 per gallon, according to quality.



“Encouraged by patronage, I have, for years past, cultivated the choicest varieties, (selected from every part of our country,) in the nursery to be well rooted, and ready for market; and more of the Scuppernong than any other variety, not only as the best southern grape, all things considered, but that it cannot be propagated, successfully, by cuttings, but by layers, or grafting.

“I started with a pretty large number of Scuppernong, and other native cuttings—of the Scuppernong mostly. The cuttings of this grape all put out in the spring, but, as usual with them, they all died in the summer. It is best for the American vintner to start his vineyard with well-rooted vines, reared in the nursery, from cuttings, or from layers. Even in grafting, it is better to begin in the nursery, and transfer into the vineyard, after a year's growth; this is a common method with me; though I have a very pretty portion of vineyard acquired by searching the woods, late in the spring, when vines are in the leaf, and getting stocks of the Fox, and other common kinds, an inch or upwards in diameter, grafting them, wedge-fashion, and then transplanting, ten feet each way. The scions (having been kept back, in a cool place, from sprouting,) were Weller's Halifax and Norton's Virginia Seedling. They are kinds I esteem next to the Scuppernong, as free from the propensity to rot, and in other respects good.

“It is the uniform result of long experience, that, if grafting is effected on stocks procured or dug up from the woods, success, with due pains-taking, will surely follow, if done at any time from the complete fall of

leaves in autumn, until late in spring, or even summer, when the scion can be kept back from sprouting. But if the graft be on stocks not dug up, or stands where it is to remain, it must be done in the fall or early part of winter, to ensure success. In this way, I readily changed my foreign, and other rotting kinds, into unexceptionable native varieties. No clay, or any other covering of the grafted part, is necessary in grafting grape vines even with the ground. All that is to be done, is to saw off your stock and put in your scion, (with two or three buds thereon,) wedge-fashion, as in cleft-grafting fruit trees, and then draw earth around a few inches high, leaving one or two buds above ground; or, where the stock is very large, and inconvenient to split, I have made a gimlet hole, and inserted the scion, spoil-fashion, and then drawn the earth around.

“But, to avoid disappointment, the vintner should be aware that more trouble and attention is required in the grafting process, to pull off sprouts from the old stock, as they spring forth to rob the graft, than in the process itself; and this is far more the case in grafting to stocks standing in their original place, than those procured from the woods. To compensate for this, however, the growth from the former is much greater than from the latter, viz.: eight or ten feet a season, in the one case, but thirty feet, not uncommonly, in the other. Grafts often bear some fine clusters the first season of growth, and pretty considerably the second.” Mr. Weller is of the opinion, “that, while American vineyards far exceed European in yield, yet they fall far short in strength of the juice yielded, and therefore corresponding keeping

ingredients must be used." He is in the habit of adding "a plenty of sugar, or brandy, or both," with these ingredients. Mr. Weller makes a fine wine with grapes which are partly unripe; this is what he says of it: "Made, September seventeenth, thirty-three gallons, composed as follows—of five bushels of White Scuppernong grapes, *half green ones*, two bushels of Purple Scuppernong, two and a half bushels of common or bunch grapes of the woods; fermented, after mashing (with a machine of two wooden rollers,) two hours; juice strained through folds of a woollen blanket, as it run from the press; twenty pounds of common brown sugar then added, and eight gallons of good apple brandy, and turned into a new cask, fumigated with a sulphur match." This wine "sold readily, after being racked off, for two dollars a gallon, under the name of Weller's Scuppernong Champaigne." He further says of the quality: "My wine, with no other ingredient than sugar, or pure spirit, ever added, circulated in this region, and other parts of our country, is pronounced by the best judges to be more unequivocally pleasant, healthful, and medicinal, than any foreign. Persons in delicate health have found essential benefit from its use; and, I add, that the wine made with pure spirits, as a medicated medicine, is more generally approved, than that made with sugar."

Mr. Weller's plan of planting and training has been, to plant the vines, the Scuppernong, twenty feet apart, and other kinds, ten; "to lead them up on posts, six or eight feet high, and then sideways, on trellises and scaffolding, so that, at length, underneath the canopies, nothing is to be seen, for six or eight feet from the ground,

but the main vine stems and supporting posts." He adds: "but I now consider twenty feet too near, for the Scuppernongs, thirty or forty being better, unless it is intended to remove every other one, before they become too large." He saves all the leaves of the vines, and digs them into the vineyard, for manure. Mr. Weller considers this as the true American system of training the vine. The principle of allowing the vine to spread and range freely, during summer, is, undoubtedly, correct, as applied to the American species, and it is what I have recommended for many years. But the system of training up the vine by posts, and then spreading them on flat frame-work, six or eight feet high from the earth, is as much a European plan as the training them to sticks, &c. I have seen many vineyards thus trained, in Italy, and other countries.\*

In speaking of the great size of the vine, he says: "I measured to-day, a Scuppernong, fourteen years old from planting, and it covers an area whose diameter is fifty feet. Another runs thirty feet on scaffolding, and then ascends an aspen tree, spreading over its branches to the height of about forty feet; the tree full of grapes. A vine in the lower part of this state, near the Scuppernong Island, in the Roanoke, whence this grape and its name originated, produces its annual yield of five barrels of wine, I am most credibly informed.

\* "The vineyards are much more beautiful than the German fields of stakes. The vines grow over a frame, higher than the head, supported, through the whole field, on stone pillars. They interlace and form a complete leafy screen, while the clusters hang below."—Page 237. This was on the Italian side of the Alps Views A-Foot, by J. Bayard Taylor: New York, 1846.

“The berries of this grape are very large. I have frequently measured selected ones, and found them to be three and a half, and some few, four inches round. They are more easily gathered than other kinds. A large sheet, with poles fastened to two sides, is held under the canopy, and a third person shakes the canopy above, with a forked pole, and all the ripe grapes fall into the sheet, and the green ones remain on. They are ripening here about two months; and that period ensures *successive gatherings*, and the *most delicious* of grape fruit. It is a peculiarly southern grape; and for the south it is, doubtless, the best grape in the world, considered in all respects. I learn this grape does well everywhere south of latitude 37° N., when properly managed, and this is, to trim enough, in the first stages of its growth, to prevent its becoming bushy, and afterwards, (say fifty years, or no telling how long a vine will flourish,) to keep, by scaffolding, the canopies clear underneath of all straggling or hanging down branches, six or eight feet high. This being not done, the vines will surely fail to bear well, and to have the fruit in perfection.

“My Halifax, I estimate next to the Scuppernong grape. It runs or spreads to a great extent. From my study, I see the top of an apple tree covered with fine large clusters, and by measurement, with a ten-foot pole, I find the tree forty feet distant from where the main stem of the vine stands, to the ground, and the tree is twenty feet high. The berry is as large as a common bullet, and the clusters of uncommon size. It changes its color to a bright purple, long before it ripens, and is a good table grape. The Norton Virginia Seedling, next

in excellence, is a good eating grape, or for wine, as soon as it changes to a dark purple.

“ *Grapes for Cultivation at the South.*—Of one hundred and fifty varieties of grapes, I have not more than about twenty I consider good and unexceptionable in all respects, for *American* culture. My foreign grapes, after trial, I cut down as worthless, and of some, even noted natives, I cut down all but a few, and grafted other kinds upon their stocks. Of the Catawba, Isabella, Herbemont's Madeira, and the Ohio, or Segar Box, and others, I retained a few specimens for their fruit, when any happened not to rot, which is about one season in three, with me; though I see, from the Patent Office report, that the Isabella and Catawba are not so prone to rot in the state of Ohio, and that, more northerly, they are still less prone. The rot is a grand difficulty at the south, owing, I suppose, to the heat of the climate, and the vines prone to it, are worse, in this respect, by age. This season has been uncommonly fatal to the kinds in question. Till a few days past, we have had rain continued for two weeks; even some grapes in the woods rotted. But, to close this essay, I will briefly report those varieties, in my vineyards, rotting and not rotting. The Isabella, Catawba, Herbemont's Madeira, Longworth's Ohio, Elsinburgh, Norton's Large Purple, and a number of other kinds, pretty much all rotted, some others about half. The Vine Arbor, Somerville, my Halifax Seedling, (from the seed of the Halifax, a most excellent grape,) Brinkleyville, and a few others; some few rotted on part of the vines. The kinds least prone to rot, are Scuppernong, Weller's Halifax, Norton's Vir-



ginia Seedling, Lenoir, North Carolina, Hunterville, Franklin, and some other varieties, good in every respect, and none of which rotted this season.

SIDNEY WELLER.

*Brinkleyville, Halifax County, North Carolina.*

It is only by such tests as the above, that the grapes which are suitable for a certain climate, can be ascertained. It appears that the Scuppernong is the most valuable for the south,—this is of no value whatever, at the north, being more tender than the foreign kinds. In Massachusetts, thus far, the Isabella is the only kind that has really done well in all situations ; at the south, this rots badly.

The Syrian, Portion Noir, White Nice, Muscat of Alexandria, and Verdelho, varieties of the grape that do not push so early in the spring as other sorts, should be tried at the south, as well as the kinds which ripen early. This difference may cause some of them to escape damage, from heavy rains, or other evils. The cluster grapes, as Black July, Miller's Burgundy, Pitmaston, and others, are more liable to suffer from the rot than the loose growing kinds. Training them high, as in Italy, from tree to tree, may be the means of preserving them from the rot and blight. If this plan is tried, plant the vine at a distance from the tree, so that the roots of the two may not interfere. The vines may be trained, the two or three first years, to a pole in the earth, and thence carried by a cord, (or any other way that may recommend itself,) to the tree ; thence up the trunk, and around the three sides, resting upon a limb, over to the second

tree, and there secured, the fruit to be borne on the cane between the trees; the spur-pruning of this is advised. Another plan of training is, to let the vine run up a single tree, and branch off among the limbs which may be well thinned of its branches, to admit the sun and air, and the vine can be pruned so as to be kept within reach.

“*To prevent the ‘Rot’ in Grapes.*—By a Jerseyman. Dear Sir,—You will probably call to mind a conversation between us, when I was at Newburgh, in 1846. I laid before you an account of the disease which had then made its appearance in our native grapes,—the Isabella and Catawba. It commences about the first of July, in the form of a dark spot upon a few berries. These, afterwards, become entirely spoiled by the disease; and this rot spreads, from berry to berry, till a large part of the bunch, or, in many cases, whole bunches are entirely spoiled by it. Wet seasons, unsuitable soil, and various other causes have been assigned for it; but, as yet, to my mind, no satisfactory explanation has been given.

“You advised me, at that time, to apply sulphur and lime in the form of gypsum, or common ground plaster of Paris; and you also advised me to use the leaves and prunings of the vines for manure.

“This is the second season of my trying your advice; and, as I received it with the promise of making known the results, I accordingly send you a brief statement, which, I think, proves that the advice was good.

“I have about twenty vines of the Isabella and Catawba grape, in a full-bearing state, trained on upright trellises. In the month of June, (latter part,) 1846, at the time I made the summer pruning of the vines,—

cutting off the side shoots, two joints above the fruit,—I opened shallow trenches, say four or five inches deep, at the roots of the vines to be pruned. As fast as the pruning was finished, the leaves and young stems cut off, were laid in these trenches, *sprinkled with sufficient gypsum or plaster, to whiten the foliage*, (from a pint to a quart per plant,) and the whole trodden down and buried in the trench.

“As soon as the leaves fell in the autumn, I repeated the process,—raking up the leaves and burying them around the roots of the vines, after dusting them over with plaster, as before.

“In June, 1848, the present season, I repeated the same operation at the summer pruning.

“Now the result is as follows:—

“Although the season is remarkable for the prevalence of the rot, not a berry on any of these *six vines*, so treated, is affected; the crop being, on the contrary, very good,—the fruit large, and increasing in size. The vines, too, are remarkably healthy and vigorous.

“On the other hand, the remaining vines, fourteen in number, are every one affected by the rot—some of them very badly; and, even on those least affected, ten per cent. of the berries are destroyed by this disease.

“I cannot, therefore, escape the conviction, that the treatment you proposed has, so far, been effectual, in preventing this disease.

“I ought to add, that the vines of my neighbors, generally, are much affected by the rot, this season, and that I have seen no Isabellas or Catawbas, this season, that surpass, in appearance, those on the six vines alluded to.

"The 'rot' is a disease that has only appeared within five years, in this part of the country. At the south, I am told, it has always existed. On the Ohio, as I gather from Mr. Longworth's remarks, in your journal, it is quite troublesome in the vineyards; and it appears to be on the increase, through the country generally. A remedy for this disease, must be considered a public benefit, and I therefore send you the above remarks, for publication, if you deem them worthy.

"Your friend,

"A JERSEYMAN.

"August, 1848."

"*Remarks.*—We thank a 'Jerseyman,' for his account of the, apparently, quite successful experiment. Our advice was based on two considerations; in the first place, we supposed that the rot might be owing to the want of some inorganic substance in the soil, necessary for the perfect maturation of the grape; and, secondly, perhaps to the use of crude animal manures. As *sulphur* and *lime* are large constituents of those volcanic soils abroad, where the grape thrives best, we recommended the use of a common substance—gypsum—likely to supply them; and as the foliage and shoots of the vine are well known to afford the most perfect food for the growth of that plant, we recommended the use of the prunings and fallen leaves, buried in the soil, for manure.

"It is worth while, now, to repeat the experiment on a larger scale, in vineyard culture, and we, accordingly, recommend it again to the vine-dressers on the Ohio,

with a similar request for a statement, when they are ready to 'report progress.'—EDITOR OF THE HORTICULTURIST." Vol. 3, p. 121.

I have never had the rot attack a grape in the open air. In the grapery with too much dampness, or in very wet weather, it sometimes appears, and is easily checked by fires, drying the air of the house. It shows itself first on the White Frontignan, in small brown dots, very minute; they soon spread and meet; a break in the skin next follows; the berry soon rots, affects its neighbor, and more or less, or the whole of the bunch, is destroyed. Excess of moisture at the root will promote if not produce it. If it is prevented by the application, as stated in the communication above, it must be a different disease from that I am acquainted with. Mr. Downing says, "sulphur and lime are large constituents of the volcanic soils abroad, where the grape thrives best;" but I have always understood, that, if the weather was too wet, even in those countries, they suffered from this evil, particularly when the wet weather came when the fruit was ripening or ripe.

*Indiana Cultivation.*—Mr. John Davis, of Indiana, ten miles from Louisville, Kentucky, in 1842, had a vineyard of seven acres, but, at that time, one and a half acres only of it was in bearing. The vines were planted in rows, six feet apart and three feet from each other in the rows. The editors of the Louisville papers say, that, in September, the vines in bearing, presented the appearance of almost "solid walls of fruit."

Presuming that the information, from this vineyard,

would be valuable, as detailing the result of several years' experience, in comparatively a new section of grape-growing, in this country, I addressed, the past spring, a letter (with such queries as I thought would procure the desired statements,) to the proprietor of the place. The letter was received by the owner of the vineyard, Mr. Amos Goodwin, who, in the best spirit, gave me all the desired answers. The most of his letter is published in his own words, as follows :—

“I have about eight acres in cultivation ; the vines are planted in rows, about six feet apart, and at the distance of four feet in the rows. My system of pruning consists simply in shortening in the wood of the past year's growth, from one to a dozen eyes, according to the condition of the vine, and afterwards tying up the new growth to the trellis, from time to time, as it may seem to require support. Stout stakes, about five and a half feet high, with narrow strips of board nailed on them, constitute the best trellis. I tried wire, but the sun heated it to such an extent, that it killed the tendrils of the vines, and frequently injured the young wood.

“My grapes are principally Catawba ; I have a few of the Isabella, but do not use them for wine. The Catawba, as a wine grape, has, in my opinion, no equal among grapes that can be successfully cultivated in our climate.

“We have, occasionally, had the leaves of our vines eaten in places, by an insect, but never to an extent sufficient to be injurious. The rot is the great enemy we have to contend with ; some seasons, twenty gallons of wine per acre can hardly be realized from our vineyards,



in consequence of it. I have noticed, that, whenever wheat is injured by the rust, the grape is, to a proportionate extent, affected by the rot. They, doubtless, originate from a common cause. As to what that cause is, great diversity of opinion exists. My observation does not enable me to give, with confidence, any opinion on the subject. The young shoots, in spring, are seldom injured by frost, except in low grounds. This fact is now beginning to be understood by our farmers, and the highest ground is selected, for both vineyards and orchards.

“I have never tried any of the foreign varieties, Mr. Longworth’s experience having satisfied me, that it would be but a waste of time and money.

“There are a considerable number of vineyards in our county,—I cannot, of course, speak with entire accuracy,—but I think I cannot be far wrong, in estimating the quantity of land devoted, at present, to the culture of the grape, in this county, at from one hundred to one hundred and twenty acres. In this estimate, I do not mean to include small portions grown merely for family use, but vineyards intended for the manufacture of wine. This quantity will, probably, be doubled in the course of two years more. The vineyards on the hills seem to do much better than those immediately on the river. In the rich, alluvial bottoms, they do not succeed well, the fruit almost invariably rotting.

“With regard to the profit, a careful cultivator may safely calculate on two hundred gallons of wine per acre, one year with another; he may, with as much certainty, calculate on selling the juice at the press, at from sixty

to eighty cents per gallon, making the proceeds, per acre, from one hundred and twenty to one hundred and sixty dollars. The same labor that will cultivate twenty acres of corn, will suffice for ten acres of grapes. The twenty acres of corn, when gathered, may, at the best prices and best crops, be worth two hundred and fifty dollars; the ten acres of grapes, from twelve hundred to sixteen hundred dollars. This, however, cannot be expected to last long; as vineyards increase, and they are doing so rapidly, the price of wine must come down; it can be manufactured and sold at fifteen cents per bottle, and then pay the producer better than any other crop he can raise. The Champaigne, manufactured from the Catawba, is equal, in my judgment, to the best European brands. I do not manufacture my own wine, but sell the juice to the vintners."

AMOS GOODWIN.

*Near Charlestown,*

*Clark County, Indiana, 1848.*

In a subsequent letter from this gentleman, dated in June, he says, "our grape crop looks remarkably well this season; the most trying time, however, is yet to come, from the middle of July to the period of ripening."

"Permit me to describe a method of grafting the grape upon old roots, that I have never seen in print. Cut the old root off, some two inches below the ground, by a horizontal cut; then choose a gimlet just the size of the scion to be inserted, and bore from one to three or four holes, according to the size of the root, and insert

the scions, first removing the loose bark; the holes should be two or three inches in depth, and the scions should fit accurately. I have never known them fail to grow. Old kinds may thus be changed in two years. If the operation is performed so late in the season, that the root shows a disposition to bleed, grafting cement must be used. The holes should be in the direction of the grain of the wood. I have never known this method fail, and I have never succeeded with any other, though I have frequently tried both cleft and split grafting."

AMOS GOODWIN.

Mr. Charles E. Grant, of Roxbury, who has produced very beautiful Isabella grapes, informs me, that the vine which bore them, is situated at the south of his house, and is trained on a trellis. The soil is that thrown out by digging for the cellar, previous to building the house; it is a clayey loam; this was enriched by the addition of stable manure, old leather, &c., and immediately under where the vine was planted, about ten pounds of glue, which had been damaged, was placed, and covered with soil. Mr. Grant is particular in limiting the crop, cutting away, freely, the bunches, and thinning the berries also. The spur-pruning is followed.

The following account of the vineyards in Pennsylvania was furnished me, at my request, by H. W. S. Cleveland, Esq., who obtained the information from the best authority, one of the largest cultivators of Reading:—

"On the mountains in the vicinity of Reading, Pennsylvania, the grape is extensively cultivated by the Ger-

man inhabitants. I am told, there are about one hundred and forty acres planted with vines, in that neighborhood; some of the vineyards are fifteen years old. The soil is a red slate; limestone soils are avoided, as, they say, the grapes on such soils are more apt to mildew, and do not ripen so well. This, I have been assured of, by men of much experience in vineyard culture, and it certainly is a very important fact, if it is a fact. The aspect is the southern side of a hill, often a very steep mountain side. Before planting, the land is trenched, by running three ploughs, successively, in the same furrow. The rows of vines are five feet apart, and the vines six feet in the rows. The vines are trained to stakes, five or six feet high, and are cut close to the surface of the ground, raising new shoots from the stump, every year for fruit, which are left two or three feet long, and then cut off at the stump, after fruiting. They prune any time between the fall of the leaf and first of March. The only grapes cultivated, are the Isabella and Catawba. Till within a few years past, they have only used the grapes for wine, which is universally drank by the Germans in that vicinity, and sells readily, at wholesale, for seventy-five cents the gallon. They calculate that twelve pounds of grapes will make a gallon of wine, and an average yield will give twenty barrels per acre. No spirit or sugar is added to the liquor, which is therefore nothing but the pure fermented juice of the grape. Within a few years, some of the cultivators have begun sending the grapes to Philadelphia, for the table, where they sell them, at wholesale, for eight cents per pound. They are packed in boxes holding one hundred pounds

and upwards, with alternate layers of grape leaves, and are sent by railroad, fifty or sixty miles."

HORACE W. S. CLEVELAND.

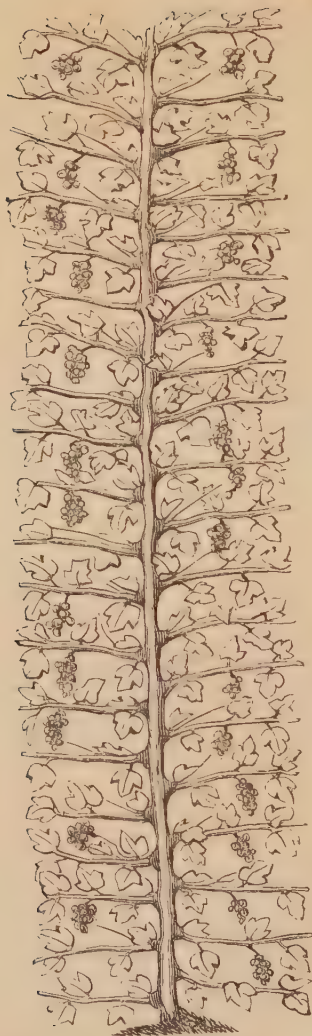
*Propagating Vines for Planting.*—The custom of planting cuttings immediately in the vineyard rows, where they are to remain, has been, heretofore, the practice, and is still so, in most countries; the cutting consisting of well-ripened wood of the current season, with a small part of the old, or two years wood, the form being that of a small mallet. The wood of the vine roots freely, and cuttings of one season, if well ripened, I have always found to grow. The best method of raising vines, is by single eyes, leaving a quarter or a third of an inch of wood on each side of the eye. This method requires a bottom heat, to meet with good success.\*

The cuttings of my vines, which are made at the autumn pruning, I usually mix with the leaves, manure, and litter, with which the border is covered, and they, though placed there as manure, root freely, and we are constantly weeding them up, during summer. It is said that the Scuppernong, and some other kinds of American grapes, do not do well from cuttings. With such varieties, the process of layering must be resorted to, and, to make the most of the cane, in this case, the shoot to be layered, should be cut between each eye, obliquely, two-thirds through the wood, and a piece of shell, or glass, or hard wood, put in the cut, to prevent its closing. Roots will be thus readily made, and the vines may be taken off, and planted out in the fall, or early spring.

\* See Mr. Roberts's directions, for this plan of growing vines.







This drawing represents a vine after it has become established in the grapery, and has been planted six or more years, and has been pruned agreeably to the plan which I have adopted, and described, pages 211 to 230, inclusive. The lateral shoots, which proceed from every leaf, or eye, on the current year's wood, are not represented.

# DIFFERENT SYSTEMS OF TRAINING AND PRUNING EXPLAINED.

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HOARE'S PLAN.—After planting, the vine must be cut back to two eyes.

The first year, if more than two shoots push, rub the others off, and train the two shoots to the trellis. As soon as it appears probable that no accident will happen to the strongest of these shoots, cut out the other; this will be about the first of July; continue to secure the shoot to the trellis, from time to time, as it grows, pruning in the laterals, to one eye.

In November, cut the vine down again, to two eyes.

The second year, train exactly in the same manner, and if any fruit appear, take it off.

Early in November, cut the vine down to three eyes, thus :

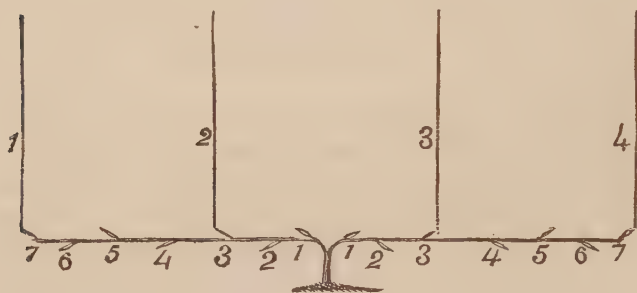


The third year, train up the three shoots, and rub out all others; in July, prune out the weakest one; stop all

laterals as before; continue to train the other two carefully, during the season. About the first of September, pinch off the ends of the shoots.

In November, cut back the two shoots to seven buds each, and prune out, carefully, all the laterals, close to the buds.

The fourth year, early in February, cut out of each shoot, the first, second, fourth, fifth, and sixth buds; then bend the two shoots carefully down, and secure them in a horizontal position, thus:—



Train the shoots that push from the eyes, three and seven, in the manner indicated by the dotted lines, and if more fruit shows than is proper for the vine to bear, cut it off after the berries have set; the same treatment of the vine is to be pursued, during the season, as last year.

In September, stop the top of the shoots.

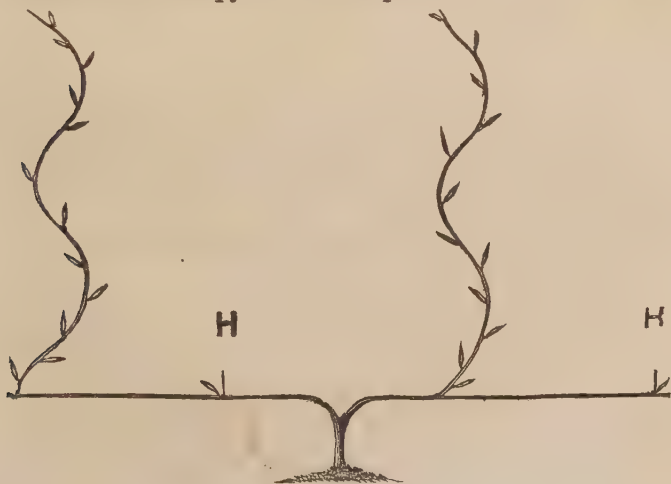
In October, as soon as the fruit is gathered, cut back the first and third shoots to as many buds as may be deemed necessary to produce the quantity of fruit which the vine can mature, the next year, and the second and

fourth shoots, to the lowermost bud, each; cut out the lateral shoots close to the buds.

The fifth year, train the two canes in the manner represented below; and the two shoots, which will push from the spurs H, H, train also in the same way.

The vine has now assumed the form which it is permanently to retain, and it may be considered as the commencement of a system of alternately fruiting two shoots, and of training two, at full length, for bearing wood to fruit the following year; which method can be continued, without alteration, until the vine is able to mature more fruit, when the arms may be extended, and as many more upright or bearing canes added as are required.

This plan may do for the Isabella, or other native kinds; it might answer on the back trellis of a house, but, for the roof, it would not succeed so well as the shoots would occupy too much space.



It is liable to the same objections that all the long cane systems of training are.\*

The long, or succession mode of pruning, is recommended by Mr. Loudon, and many others. It is thus:—

The *first year*, one shoot only is allowed to grow, which is cut down, at the autumn pruning, to the second or third eye.

The *second year*, two shoots are encouraged, the strongest of which must be stopped three or four buds beyond the middle of the root, the weaker one after growing three or four feet.

At the fall of the leaf, the shoots are to be reduced ;

\* Extracts from a Journal of a Horticultural Tour. By a deputation of the Caledonian Horticultural Society. Edinburgh, 1823:—

*Ghent, seat of the Baron de Vrocylande.*

"There are two small vineries, which did not afford us much satisfaction. The vines are planted in front, on the outside of the house. Every year, a new set of wood is taken into the vinery ; the wood produced this year, is trained upright, on an exterior trellis, and is, next season, laid down to a sloping trellis, and made to yield its fruit within the house.

"The wood which has once been forced, is cut entirely out ; and from the same roots, new upright shoots are, annually, required. The shoots which had been forced, still remained, and a bare inspection was sufficient to satisfy any one, that they could have afforded but very few grapes. The exterior, upright shoots, of this season, were, at the same time, in a very backward state, and there was (sixteenth August,) little prospect of their acquiring maturity this year."

The natural soil of the garden is represented as light and sandy ; but no mention is made of the border for the vines.

At the seat of Madame Vilain Quatorze, also, at Ghent, the same method of forcing the grape is pursued, and the result is, sickly and weak vines.

At Brussels, also, they found similar training and pruning, and with no better success.

This plan of training, etc., is upon the renewal system, and, where this is adopted and continued for many years, the effect must be to weaken the vine.

the main one must be pruned back to the middle of the roof, and the lower one to the third eye.

The *third year*, one leading shoot is to be trained in from each cane, and, from the main cane, fruit-bearing side shoots will be produced ; one bunch only on a shoot should be retained, and the shoot stopped at one or two eyes beyond it. No side shoots should be allowed to grow from the spur or cane which was cut back, the leading shoot from which is to become a fruit-bearing cane the next year.

In November, the shoot from the end of the fruit-bearing cane must be cut at the top of the rafters, or within a foot of the top, and the shoot from the spur must be pruned back to the middle of the rafter, and all the spurs that bore the fruit must be pruned out.

The *fourth year*, a crop will be produced, both in the upper and lower part of the house, the long cane-bearing on the upper part, and the shorter on its whole length ; a leading shoot must be trained from the short cane, and another, a new cane, from a spur below.

In pruning, at the fall of the leaf, the long cane must be taken entirely away, and replaced by the cane that bore the fruit on the lower part ; the spurs on this must be cut out, as on the cane last year, and the new cane brought up this year, must be cut back to the middle of the rafters ; a spur must be left below, to lead up a new cane from, the next year.

By this system, you have the whole length of rafters fruited by two canes, and a third one is to be growing for the next year, to supply the place of the one which is to be cut out at the fall pruning.



This is, unquestionably, the best system of pruning, on the long cane principle, and it is explained here by a representation of the vine in the successive years.



*a*, is the vine after planting.

*b*, is the vine cut back, at the close of the first year of growth.

*c*, is the vine cut back, at the close of the second year.

*d*, is the vine as it will be, after pruning, at the end of the third year.

*e*, shows the vine with the first bearing cane cut out, and pruned for fruiting the next year; every successive year, the long shoot must be cut out, and its place supplied, as above directed.

Another system, practised in this country, is, to train a new cane, every year, the whole length of the rafter, to fruit the successive season; the cane, which bore the fruit, being pruned back to one eye, in November. This is more simple than the former plan; but an objection to this, and all other long cane pruning and training is, that it requires the vine to produce and ripen a large crop of fruit, and a great extent of wood also, every year. The result of this plan would be, that, in a few

years, the vine would evidently be less and less vigorous, and the new cane would be constantly growing smaller, until the vine would not bear any fruit, when a year of rest would be required to enable it to ripen a crop again. By this system, you can grow very large bunches of fruit; but, if it is true, that large bunches are not so good as smaller ones, (which I hold to be the fact,) then there is no advantage in this. There is no difficulty in having a great abundance of fruit show itself, under any judicious pruning; the only fear is, that you will leave more on the vine than can be ripened properly, and this risk is increased by having very large bunches.

Another plan is, to have one long cane the length required, and to be spur-pruned, as recommended as the best system of pruning, differing from that, however, in the cutting of the spur clean out, at the fall pruning, and not at one eye, as there directed. The reason for preferring to cut at one eye is, that, at the base or crown of the spur, are a large number of dormant eyes, which will all, or a great many of them, push when close pruning is practised; and, where there are a great number of vines, the trouble of rubbing out these is considerable; but when one eye on the spur pushes, it will prevent these from growing; and if, at any time, the eye, from injury, does not push, then the dormant eyes will, and you can retain a shoot, and when this system of pruning has been carried out many years, and the spur becomes too long for convenience, or unsightly, then you can train one of the shoots that are constantly pushing

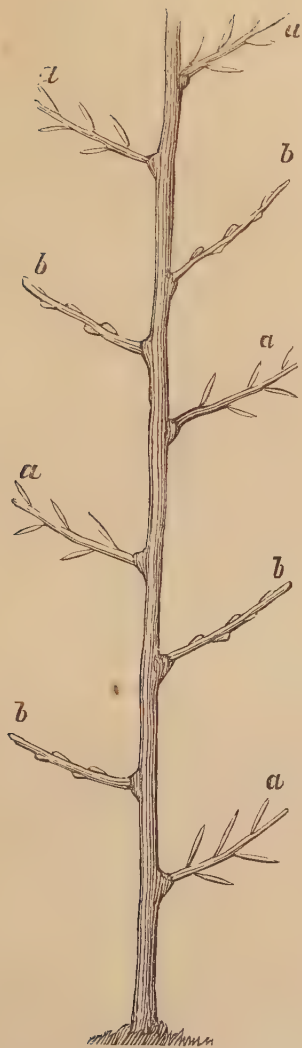
on the bare wood of the spur, and prune back on that, in the autumn, to one eye.

Another plan of spur-pruning, which is recommended to be practised, when the object desired is to grow large bunches, and the regularity and neatness of the vine are not considered, is to prune the shoot at any length, cutting so as to leave a full, strong eye at the end, for fruiting; all the intervening eyes, excepting the one at the base, are to be pruned out; this is to be grown for fruiting the next season, and is to be pruned, at the autumn trimming, at the prominent eye; the shoot which has fruited, and all the back wood on the spur, should be cut out entirely.

Still another method of spur-pruning, when the object is large bunches, as above, is to have four or five spurs only, on each side of the cane, fruiting, each year, the alternate spur; the cane on every other spur is to be pruned back to one eye, and the alternate cane to two or three feet, and five or six bunches allowed to ripen on each; the cane which ripened the crop the first year, must now, at the fall pruning, be cut back to one eye, and the cane which is to fruit the coming season, should be pruned to two or three feet.

These are several of the most approved and generally adopted systems of training the grape. Whatever method is used, should be persevered in for several years; constantly changing from one system to another is bad, and the result will be unsatisfactory.

If the border has been well made, and the vines have



*a a*, are the fruiting spurs.

*b b*, the spurs on which the shoots are growing for the next year.

[To face page 226.]



never been over-cropped, and the temperature of the house, with the thinning of the berries, and summer pruning of the shoots, have been properly attended to, crops of fine grapes can be had from vines pruned in any of the methods described. The plan recommended and adopted by myself, is considered the most simple, and the one taxing the vine the least of any to ripen additional wood; it is easily kept within narrow limits, giving ample room for the light to be admitted.

In the best vineyards, where the richest wines are made, they limit the crop a plant may bear to a small number of bunches, usually from eight to twenty-five in number, and in weight to from ten to twenty pounds; in some parts of France, where they plant the vines very close, to a much smaller quantity.

At Xeres in Spain, the sherry wine district, two or three mother branches are trained up with one spur on each to fruit, and the vines are planted five feet apart each way. The crop is limited to eight or nine bunches, weighing about fourteen or sixteen pounds.

At other vineyards in Spain, where poor wines are made, the vine is allowed to bear twenty-five or thirty pounds.

In the vicinity of Malaga, where the Muscat of Alexandria grape is grown for the purpose of making raisins, they prune close to the old wood every autumn, and the plant is kept close to the surface of the soil, which is a rotten slate; the shoots are not tied up, but hang, or lie upon the earth. The fruit also lies on the ground, and if it were not so gravelly, it would rot; the average yield, per vine, here, is from seven to fifteen pounds; this grape



makes the best, or Muscadel raisin. The grape from which the Bloom raisin is made, is an inferior kind, and the grape of commerce a still more ordinary one; these are grown in the interior, and the vines are allowed to ripen from ten to twenty-five pounds.

Near Perpignan, in France, the vine is trimmed at about six inches from the ground; from the spurs, at this height, the bearing shoots proceed, and are not supported at all; the close spur-pruning is followed; from three to eight spurs are allowed on a vine, according to its age and strength.

Near Marseilles, they sometimes prune to three eyes on a spur, and each vine is allowed to bear from eight to twelve bunches, or from twelve to twenty pounds.

At the vineyards that produce the fine wine called Hermitage, the plants are only two and a half feet apart, and are two feet high, supported with stakes five feet long; only one branch is allowed to fruit, and this is pruned back to from three to eight eyes, and from eight to ten bunches is the average crop.

At the vineyards which produce the Burgundy wine, the plants are grown yet closer together. The rows of vines are only two and a half feet apart, and the plants in the rows are only twelve or fifteen inches. After the vines have been three years planted, the space between the rows is filled up with vines, making the distance between the plants only fifteen inches.

At the vineyards of Epernay and Ay, where the Champagne wine is made, the vines are, in the rows, planted as near together as six or seven inches, and the distance between the rows is only eight or nine. Of

course, the vines are feeble, and produce but a small quantity of fruit each; the shoots are also very small and weak, but the vines being so close together, the general aggregate of fruit produced is large.

At the vineyards on the banks of the Rhine, the vines are supported by stakes five or six feet long; this is the case, generally, in the vineyard culture of the grape in France. The spur-pruning is usually adopted.

In Italy, also, the same system is generally employed. In this, and other countries, I have seen the table, or flat trellis used.—(See note to North Carolina system.) By the road sides, the long cane-pruning is practised in the following manner:—A vine is trained up the trunk of a tree, and, at the height of twelve or fifteen feet, a long cane of the vine is led from this tree to another, and secured; these canes, hanging in festoons, present a beautiful appearance when the fruit is in perfection.\*

In the Azores, the vines are not supported by stakes; usually, a small pile of stones encircles the plant, and the bearing shoots lie on these. Muscats, and other choice kinds, which are grown expressly for the table, are generally trained on a trellis.

At Pico, where the wine exported from Fayal is made, the vine is trained on the surface of the soil, (which is mostly volcanic rock,) between walls composed of stone,

\* "As we advanced, the houses became more Italian-like,—and the vines, heavy with ripening grapes, hung from bough to bough, through the mulberry orchards." Page 239.

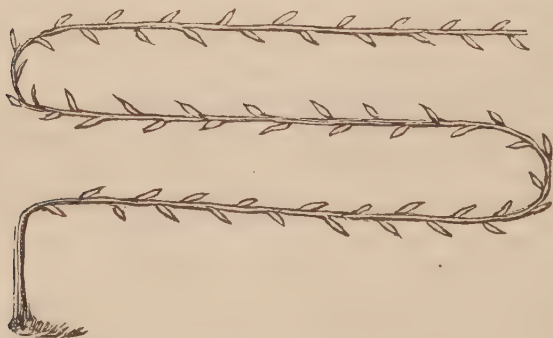
"The vines which hung from tree to tree, were almost breaking beneath clusters as heavy and rich, as those which the children of Israel bore on staves, from the Promised Land."—Page 276. Views A-Foot, by J. Bayard Taylo<sup>r</sup>. New York, 1846.

or lava ; and between these, cross-walls are frequently interspersed, to break the force of the winds, intersecting the vineyards in the same form as a window-sash. At Madeira, a similar method is pursued.

Vines, in the open air, are more free from mildew when trained quite high or very low.

In villages on the continent of Europe, it is common to see, in the principal streets, the vine trained on the houses, above the lower windows, about twelve feet from the ground ; a great quantity of fruit is thus produced at little expense ; the roots running under the pavement of the street.

The kinds grown are usually the small black sorts, similar to the Early Black July, and Miller's Burgundy.



They are trained to suit the taste or convenience of the cultivator. The following method is frequently met with :—The leading shoot, after the vine has become established, should be treated as directed in the rules for the management of the American grape.

The pruning is on the short-spur system.\*

It should be borne in mind, that the larger the crop a vine is allowed to bear, the longer will be the time required to mature the fruit, and the quality of which will also be deteriorated in proportion to its amount.

The native varieties of the grape, when planted in a soil naturally dry and suitable, will do well without a prepared border; but, as a general rule, it must be remembered that the more care there is bestowed on the preparation of this, the greater will be the chance of success.

The Black Hamburgh grape, when well cultivated, is a richer fruit in this climate than in that of England, and it is necessary to test the quality of the foreign kinds here, as the experience of European cultivators does not always coincide with our own.†

\* In the *Journal of Horticultural Tour*, Edinburgh, 1823, is the following:—"Grape vines are likewise commonly trained against the walls of the houses, in the outskirts of the town, (Rotterdam,) and we were assured that they often prove very productive. A long shed, extending two hundred feet, was thickly clothed with vine branches, which were tolerably well filled with fruit. There were, in all, six plants, which grew in the open area, next the street; we observed both White and Black grapes; the latter were more numerous, the Frankendale."

† Dr. Lindley, after some remarks relative to fruits of American origin, in which he states their "utter worthlessness in England," advising his readers not to try them, closes with this language:—"They can only be disappointed so long as the mean of the hottest month is  $64^{\circ} 40'$  in London, and  $80^{\circ} 70'$  in New York."—*Gardeners' Chronicle*, 1848, p. 51.

By the above remarks, it would seem that Dr. Lindley attributes all this difference in the quality of fruits, to the diminished quantity of heat; doubtless, in this difference of heat, he means to include also the effect of the relative proportion of diminished light from the sun, which is, in part, the cause of this lower temperature. But these circumstances will not always explain the causes of these differences in the goodness of fruits. For

## FLORIDA CULTURE

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THE Hon. A. G. Semmes, of Florida, has been experimenting with Grapes in open culture in that section of the United States, and with marked success. The reader of the following remarks, (extracted from letters to the author of this book,) will see, that, notwithstanding his vineyard has been destroyed by a terrific gale, enough has been proved, to show that the vine in its richest varieties will repay the cultivator for his efforts.

APALACHICOLA, June 29, 1850.

“On receiving the cuttings of the Josling’s St. Albans, enclosed in your letter, I found two of them alive, which I grafted on wild stocks; they took at once, and are now

instance, the Black Hamburgh grape cannot well be surpassed in richness of quality, when well grown, in this country. It is generally spoken of as a very desirable kind to cultivate, on account of its hardiness and good bearing qualities, and not of its being anything more than a good grape; “though not of the very first quality,” is the term often used respecting it, in England. The Esperione is there spoken of as but little inferior to the Hamburgh. In Massachusetts, it is very inferior, and not worthy of a place in the front border of the house, but on the back wall, where its roots can be kept quite dry, the quality is better; in a position where its roots are situated in a soil, as regards moisture, more unlike that of England, it approaches more nearly to the quality of the fruit there. If heat caused the difference in the Hamburgh, why does it not in the Esperione? I presume that the soil of a country has some effect, as well as the sun and heat, in effecting these changes. It is not confined to any one fruit, but the change is noticed in apples, pears, grapes, peaches, cherries, and other kinds.

growing rapidly. I will have a fine crop of fruit from them next year, for you will understand that a vine grows in this latitude in one year, what they do in your latitude in at least three years. The last season, I raised a fine crop from a graft of the Muscat of Alexandria (on wild stock) one year old, one bunch weighing eight and a half pounds, and perfect in form and flavor."

"The birds are the only evil we have in this climate in raising foreign grapes. They never touch a white grape, probably waiting for them to turn black."

"Our season has been quite backward this year and my grapes have not matured as early by a month as last year. During this month I have had the Early Muscadine and Malaga in abundance. The Black Hamburgh, Black St. Peters, and Muscat of Alexandria, are ripening rapidly, and will be in perfection the following months, July and August. My native grapes, Isabella, Catawba, &c., ripen in August and September. The Isabella here is a very inferior grape, and ripens very badly. The Catawba is its superior in every respect. Bland is superior to either. But the great southern grape is the Scuppernong; in this latitude far superior to North Carolina, its *reputed native place*. A gentleman of high character and intelligence, who cultivates the Scuppernong in Louisiana, says it is a Grecian grape, and that the Greeks make their finest wine from it. We never prune it, and its yield is almost incredible; when perfectly ripe the fruit is a very deep bronze, very sweet and with but little pulp."

"The foreign grapes, grafted on our native stocks, do far better than when growing on original stocks, are



much more hardy, far more luxuriant, and bear better and earlier. The Isabella stock will, in two years' growth, exceed any foreign variety I have tried, in four or five years' growth, but any foreign variety grafted will grow as rapidly as the native. I have foreign vines now, grafted last February, many with five and six branches, each branch or stem from fifteen to twenty-five feet, and they have until December next to grow, when foreign varieties commence dropping their leaves. The native varieties drop their leaves some six or eight weeks earlier, except the Scuppernong, which continues to grow till sometime in December."

"I train my vines on a trellis from seven to eight feet high (of wire), but cannot follow the rigid system of pruning recommended in European culture, and practised at the North. Where the vines are allowed to grow with but little pruning, a trellis is far preferable to the arbor, for many reasons; but we have to so train our vines, that not a ray of sunshine ever touches the fruit; otherwise the fruit loses much of its fine flavor and is altogether robbed of its bloom, which, if it does not preserve its flavor, at least adds to its beauty. The grapes I raise (as an amateur) are said, by northern gentlemen here, to be far superior to any they ever tasted from the hot houses at the north. There can be no climate in the world superior to this section (West Florida) for the foreign grape. I have tested the raising of the foreign varieties, at least for six years, and have no doubt as to the success of any one of ordinary intelligence undertaking the business. The only objection in this place and immediate neighborhood is, the soil is too sandy. This we

have to remedy, which we partially do. I manure altogether with bones (whole), shells, and palmetto roots, all deposited in the ground when the vine is planted; they will last, I believe, twenty to thirty years. The latter article contains a great deal of potash, and it affords a fine manure, though of course not so durable as the former. Animal matter I never use, unless decomposed, in which state it is very superior. There is no substance, however, equal to bones, and the larger and fresher the better, as they afford, by their gradual decomposition, the very richest and most suitable manure for the vine. If, however, wine and not table fruit is the object, vegetable manures should be used to the exclusion of bones and other animal matter, and this for obvious reasons.

“Allow me to say that I have derived much satisfaction in reading your work on the grape. The arrangement and your own remarks on the views of other writers are most judicious.”

“I have, I believe, all the publications on the subject extant, and thinking, as I do, that it is superior to any of them, have recommended it to many of my friends.”

“QUINCY, FLORIDA, *December 22, 1852.*

“Yours of the 5th instant has just been received, and I reply without delay: The severe gale of 1851 destroyed my vineyard in Apalachicola. Being located some 150 yards from the bay, the water swept away my dwelling, and killed many of my most valuable vines.

“The remnant I brought with me to this place, where I removed last January. I had some 600 vines, out of which I have saved 20 or 30. The cuttings you sent me

were all growing finely, most of them having been grafted on native stocks. This year would have tested their quality and adaptation to this climate; but, I regret to say, I have lost them all, except one of the Josling's St. Alban's.\* So soon as I can make the necessary arrangements I shall again commence. After the most thorough trial, I am perfectly satisfied that the foreign grape can be cultivated in this climate with success. The climate is in every respect adapted to its cultivation, and the soil, which in this section is objectionable, (being a heavy clay,) is very easily remedied. The ground once properly prepared, all that is necessary to ensure success, is a judicious system of pruning and training the vines. The one, in this climate, is as important as the other, and either neglected, must end in disappointment. The rot, which is the great evil complained of by almost every one who has undertaken the cultivation of the vine in the Southern States, particularly in this latitude, is to be attributed altogether to the fatal error they have adopted in both pruning and training. The preparation of the soil, of course, is essential to the healthy and vigorous growth of the vine, and without these we cannot have good fruit; but it is a great mistake made by many writers on the subject, that certain manures, upon which the vine feeds, and which the most of our soils are deficient in, will prevent the rot. The close pruning for out door culture, adopted in Europe, and the Eastern States particularly, will not answer for this climate. The reason is very obvious. The vine is too much exposed

\* The cuttings referred to here were Hybrid Seedlings, of my own growing, and new kinds, mostly of recent introduction from Europe.

to the intense heat of our sun ; besides, on account of the heat and duration of our summers, a vine here, under proper culture, will, in twelve months, grow as much as a vine in England will in four years. And to adopt the rigid system recommended by Mr. Hoare, would ensure a loss of the fruit every year, and, in the end, the vine itself. After a vine has become established, say after the first fruit year, (if healthy,) it should never be pruned back exceeding one half, and oftentimes not more than one third, of that year's growth, unless it be the smaller lateral shoots. This will secure a sufficient foliage to protect the fruit from the rays of the sun, *which is the main cause of the rot*. Unlike other fruit, it is all-important that the grape be *entirely shaded* at every stage of its growth and maturity, otherwise, if it escape the rot, it will be small, hard, and insipid. I have known canvass, and other artificial means, adopted to shade the vines in this climate. This will not answer ; for although it will secure the fruit from the rot, yet the rich flavor of the grape is impaired, if not entirely destroyed. The natural shade and protection of the fruit is the foliage, and the more luxuriant this is, the greater certainty of fruit of large size, and rich flavor. After several years' experience with some five hundred vines, I have never known an instance in which these suggestions did not prove true, both in regard to the native and foreign varieties, especially the latter, on account of their thin skin and great delicacy.

“ In training the vine, I much prefer the trellis to the arbor. As to the kind of grape suited to this climate, I would state, I know of no foreign variety which will not

succeed in open culture, and I have cultivated many varieties which cannot be raised in England on account of their great delicacy. The true Malaga—on account of its exceedingly thin skin, the most difficult—I have cultivated to great perfection, and it was pronounced by all who tried them, as far superior to the imported Portugal or Malaga, as a ripe peach to a green one. Among the foreign varieties, I rank first the Muscat of Alexandria; no grape can equal it in point of flavor, and I have raised them weighing  $8\frac{1}{2}$  pounds to the bunch, and without an imperfect grape. Next is the Black Hamburgh, and then the Malaga. These three I place at the head of the list of foreign grapes.

“Among the native varieties, the most valuable I consider the Scuppernong, which cannot be cultivated at the north. It is claimed to be a native of North Carolina. This is a mistake. It is a Grecian grape, known there as the *Alaric*, and from which the finest wines of Greece are made. All things considered, it is unsurpassed as a table fruit, except by the three foreign varieties I have named. As a wine grape, it has not its equal. It will yield five gallons of juice to the bushel of grapes. The fruit in Carolina is far inferior to that raised in this climate. In point of flavor, one would hardly recognize it as the same grape. This is to be attributed mainly to our long seasons, the fruit blooming in May, and ripening in August and September. The bunches are small, varying from three to ten berries each, and when properly cultivated, the grapes will average from  $2\frac{1}{2}$  to 3 inches in circumference. If manured with vegetable matter, they have but little, if any, pulp. If with bones, or

other animal manure, they are a richer table fruit, but with more pulp, and consequently less valuable as a wine grape. The vine is never pruned. It prunes itself. The knife is fatal to it. And, unlike all other grape vines, it will not strike root from a cutting, it being propagated exclusively by layers. The next best grape in this climate, of the natives, is the Elsingburgh, and with this the chapter is complete, for I know of no other worth the trouble of raising. The Isabella is utterly worthless with us; so is Hyde's Eliza. The Catawba, and Warren grapes, are each better; but those who have eaten of either the *Alaric* or Elsingburgh, and especially any of the *foreign* varieties, would never undertake the culture of the Isabella or Catawba.

"I have eaten of the best of this fruit raised by Dr. Underhill at Croton Point, near New York, and have come to the conclusion that it is impossible to rid the Isabella of its pulp, and of that wild native flavor it originally had.\*

"I have been compelled necessarily to condense my remarks, but allow me to say in conclusion that I know of no work in this country or Europe in which more valuable suggestions upon the subject of Horticulture, and particularly of the cultivation of the grape vine, are to be found than in your publication. With my entire library, it has gone to sea, in the gale of 1851. I hope you will supply me with a copy of the new edition.

\* [This gentleman is not partial to the fox flavor of the native American grape. Many can be found who are, however, and I think this number is increasing, as evidenced by the great sale of this fruit annually, and the immense quantities now grown by amateurs for their own use.—ED.]



Those who have a taste for such things, and wish to *learn*, will be repaid by the perusal.

“ Respectfully yours,

(Signed) “ A. G. SEMMES.”

When preparing this third edition, I wrote to R. T. Underhill, M.D., to inquire if he had any remarks which he might wish to have published; he being the largest and most successful cultivator of the native grape in the Northern States. The following letter was the answer received.

“ CROTON POINT, *December 25, 1852.*

“ J. FISK ALLEN, ESQ. :

“ DEAR SIR,—Your letter is received. Having been from home when it arrived prevented my returning you a prompt answer. I was in Philadelphia at the time looking after a vineyard of ten and a half acres of Isabella grapes I formed last spring for a resident of that city. That is to say, I furnished the plants, gave every direction for the preparation of the ground, and the planting of the vines, and agreed to furnish him with one of my vinedressers in two years after it was planted, when it will be of proper age for bearing fruit, and he will prune it accordingly. He will have the entire direction of the vineyard; the proprietor paying him a reasonable compensation for his labor.

“ I have in this manner established quite a number of vineyards, beside my own at Croton Point, in the vicinity of New York city, Philadelphia and Baltimore, and trust, if I live a few years longer, to form one, or more,

in the vicinity of every city between New York and New Orleans.

“ You state you are about publishing a third edition of your work on the Grape, and that it occurred to you that I might wish to say somewhat in reference to my success in the cultivation of the grape at Croton Point.

“ First I will state I have read your work on the cultivation of the *grape under glass*, and so far as I am capable of judging in this *department*, I do consider it *one of the best* that has been published. Your views in reference to the preparation of the *border* for a grapery are very correct. The gross, rank, stimulating *manures* so frequently used in large quantities, may sometimes give very large clusters, but the excellent flavor will be sacrificed, and all the good qualities proportionally deteriorated.

“ I first read your book two or three years since, and was happy to find my views were not solitary on this subject. It is a general law of the vegetable economy, that gross, rank manures, have a tendency to prevent that perfect assimilation necessary to give the excellent flavor, and secure the development of a large proportion of nutritive qualities in fruits and vegetables.

“ You state you were in New York during the grape season and that you saw ‘any quantity of very fine Isabellas from my vineyards.’ You say further you ‘never saw finer,’ and ‘that they were well ripened, rich, and sweet.’ I can not help feeling I have accomplished much, when, however complimentary I may view your letter, my fruit has secured the approbation of one of the most successful cultivators of grapes under glass in

the United States. In relation to the success of my vineyards at Croton Point, I may say, they have more than realized my most sanguine expectations. The flavor and general character of the fruit have improved very much during the last ten years; and will I believe continue to improve by close attention and good management. When a vineyard of Isabella grapes is properly formed and cultivated, the crop of fruit, in this vicinity (below the Highlands of the Hudson River), is about as certain as a crop of Indian corn. When their proper culture is not understood, a crop of fruit would be nearly as uncertain in the Southern States, as in this latitude.

“The demand for the fruit is greatly on the increase. There are ten or twelve vineyards, of moderate size, in the vicinity of New York beside those at Croton Point, many of which have come into bearing, and yet the market has shown less appearance of being over-stocked with grapes of the first quality, than it was many years ago, when the quantity furnished was comparatively small. The fact is, quite a number of our citizens are beginning to eat grapes for pleasure and health. When the greater part of the community who can afford it, partake freely of this delightful fruit, which they will in ten years, or less, if they can obtain it, it is my belief, from a close scrutiny into the rise and progress of the grape culture on the Atlantic seaboard, a hundred vineyards will not supply the demand for this fruit in New York, Philadelphia, and Boston, at remunerating prices.

“Yours truly,

“R. T. UNDERHILL, M.D.”

REMARKS ON THE USE OF MANURES.

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SINCE the publication of the first edition of THE CULTURE OF THE GRAPE, there has been much interest expressed in the question, whether animal substances were beneficial, or otherwise, as part of the compost forming the border. This interest, in this country, has been increased by an article in the Magazine of Horticulture, edited by Mr. Hovey, in which he, in strong language, disapproves of not only animal remains, but classes under the term of "quackery" almost every article that has been, from time immemorial, considered, both by practical gardeners and scientific writers, as useful as amendments for the vineyard. This opinion of his, being published about the time of the appearance of the above pamphlet, wherein I had directed most of these articles to be used in the formation of the border, excited some remark, and the question is often asked, How can there be such a diversity of opinion and practice? My belief is, that there is not so wide a difference as there would appear; the reason for this will be given in the proper place.

A subsequent article by the same editor, in confirmation of his former opinion, appeared in the February

number of his magazine, and, in support of his views, he brings forward the editor of the Gardeners' Chronicle, who disapproves of carrion, but nothing is said against shells and other articles by this gentleman; on the contrary, the application of these is incidentally approved of, by the commendation of authors who do advise their use.

The following remarks of Mr. Hovey, are the two articles referred to:—

“ *On the Formation of Vine Borders. By the Editor.*—The cultivation of the grape vine under glass is now attracting much attention; and many new vineries have been erected in various parts of the country the last two years. The formation of the border, certainly one of the most important objects connected with the successful management and future welfare of the vines, is, therefore, considered as deserving of every attention. Much has been written upon this subject in each volume of our magazine, and we have endeavored to present our readers with all the information which could be of any value to the amateur or practical cultivator. In our article in our last volume, (Vol. 13, p. 293,) upon the growth of the grape vine in the greenhouse or conservatory, we gave a few hints upon the preparation of vine borders, and remarked ‘that a *fine crop* of grapes could be obtained without all the *quackery* so often recommended in their formation, such as a bed of oyster shells, or boiled bones, dead horses, cattle, dogs, slaughter-house manure, blood, soot, &c.’

“Some of our practical friends, who have had some experience in the culture of the grape, have been some-

what surprised to find we were not a firm believer in the great efficacy of the very richest ingredients, such as dead animals, for the formation of the border, and some have been almost disposed to doubt whether our own success was not effected by some such aid, contrary to our statement. To the former, we need only remark, that we are more and more convinced, that the employment of the carcasses of animals is of no benefit whatever, but rather an injury in the end ; and, to the latter, we shall merely state that, whatever practice we recommend, we invariably adopt, until experience assures us that it is founded in error.

“The subject of the preparation of vine borders has recently attracted considerable attention in England, and various communications have appeared, in some of the gardening periodicals, in relation to the practice of using the carcasses of dead animals. This discussion has taken place in consequence of the publication of a small, but excellent little work, of only eighty or ninety pages, upon the culture of the grape, by Mr. Roberts, a very successful cultivator. Probably, few copies of the volume have ever found their way here, in consequence of the high price at which it was published. We, however, received a copy when it first appeared, and read it with much interest, and came to the same conclusion as Dr. Lindley, whose article we are about to notice, that it was one of the most thorough, practical, and common-sense treatises which we had ever read, and, saving its recommendation of the ‘*paulum*’\* of dead animals, to produce the

\* A substance affording nourishment.



‘nectar of Bacchus,’ was just what every cultivator of the grape was in need of. We had intended to have prepared a review of it, but other matters pressed upon us, and it was, for the time, forgotten.

“The preparation of our article in our last volume brought the subject up anew, and it was in reference to Mr. Roberts’s views that we made the remark before quoted. Subsequently to the publication of our paper, and unknown to us at the time we wrote, appeared Mr. Allen’s pamphlet on the culture of the grape, in which he advises the use of carcasses of dead animals, if they can be had, to such an extent as to cover the bottom of the border. In our review of this work, (Vol. 13, p. 409,) we incidentally stated our objection to this practice, believing it to be of no use, but rather injurious to the future health of the vines.

“Since that time, the discussion of this question has principally taken place, and, to show that our views are the same as those entertained by experienced cultivators, as well as scientific writers, abroad, we have quoted the following article from the *Gardeners’ Chronicle* for December last, to which we ask especial attention.”—*Magazine of Horticulture*, Vol. 14, page 49.

After describing the conservatory, and with other remarks relative to the plants therein, Mr. Hovey goes on to say, that it was not originally intended to plant vines in the house, but that, being anxious to prove kinds, “we commenced the formation of the border, not with the expectation that we should raise any grapes worth the trouble. Consequently, the border was made only fourteen feet wide and two and a half deep, and, as the con-

servatory was set well up with a view to have a fine gravelled trellis, the border was eighteen inches above the level of the lawn. The border was formed by carting in sods and good loam from an old pasture, and mixing with them about one quarter of well decomposed manure from the stable yard and from old hotbeds. This was done in July and August at leisure time. In the fall, the whole was trenched over in a rough manner, and about thirty bushels of ground bones added. In this way, the soil lay till the next spring, when it was again trenched over and ready for planting. We are not thus particular in order to show how a border should be made, but merely that it may be seen that a FINE CROP of grapes can be obtained without all the *quackery* so often recommended in their formation, such as a bed of oyster shells or boiled bones, dead horses, cattle, and dogs, slaughter house manure, blood, soot, &c. All that is necessary, in our opinion, to produce the very best grapes, is a good rich, loamy soil, well *top-dressed*, every year, with old stable manure and guano, in order to bring the roots to the surface, rather than that they should go to the bottom after the dead carcasses."

After planting the vines, Mr. Hovey directs, "that, should the weather prove dry, the roots be well watered, and the surface mulched with a little coarse stable manure."

The third season, the vines were allowed to bear from two to five bunches each. Very gentle cropping, certainly. Mr. H. says they were of superior quality, the vines were not forced, and ripened their fruit in September.

The fourth season. The regular diary of the treatment

that the vines received begins now. I shall only notice what relates to the manures. In former seasons, nothing is said about manures, and we can only presume they were applied then as they were the year of the record as this is given as a guide for the management of the vines generally :—

“ *March 1st.*—Some of the vines have burst a few of their eyes.

“ *April 30th.*—The border not yet having been dug. it was manured with ten or fifteen pounds of guano, and spaded about six inches deep.

“ *June 9th.*—The weather having been quite dry, the border has been mulched with coarse manure, and about a barrel of water given to each vine.

“ *June 17th.*—Gave the border about ten barrels of water.

“ *June 30th.*—Since the refreshing rains of the 20th to the 28th, the berries have swelled very fast.

“ *July 12th.*—Warm, with refreshing showers.

“ *July 22d.*—Was rainy; the 25th the rainy weather continues.

“ *August 8th.*—Light showers.

“ *August 10th.*—Showers.

“ *August 15th.*—The weather having been dry since the 10th, gave about a barrel of water to each vine.

“ *August 31st.*—The fruit all ripe, with the exception of the Esperione and Black Prince.”

Mr. Hovey has omitted to state, that his border was covered with coarse manure and leaves in sufficient quantity to prevent severe frosts from injuring the roots of

the vines. This is an important matter, and should not be neglected, for, in addition to the benefit derived from this protection, from the severity of the weather, the advantages from the juices of this covering being washed down amongst the soil and roots, by the rains and melting snows of winter, (particularly where the border is not of the very richest kind,) must be very great. The vines were planted, on an average, four and a half feet apart, the length of the house being eighty-six feet, and nineteen vines being the number planted. I should have planted, in the same space, twenty-nine vines, or fifty per cent. greater. And this difference in the number of the vines has a very important bearing upon the subject, as the roots of the vine in his border have this percentage more space to roam for nourishment. Allowing that the vine, thus situated, does perfect a good crop of fine fruit, still, by the plan of close planting, with a very rich border, the difference in the product must be very much in favor of the latter system.

Mr. Hovey remarks, "All that is necessary, in our opinion, to produce the very best grapes, is a good, rich, loamy soil, *well top-dressed*, every year, with old stable manure and guano." I agree with him perfectly, so far as the soil is concerned, and go even further than he does, for if this *good, rich, loamy* soil is had, you have already everything that is wanted, so far as nourishing matter is concerned, and there can be no necessity for this yearly application of stable manure and guano,—this latter article the most concentrated and powerful manure known. (I cannot see the propriety of recommending the use of this, when the application of decom-

posed animal substances is forbidden.) If such a soil can be found, the only preparation requisite before planting the vine, will be, if the situation requires it, some kind of application, such as shells or charcoal screenings, which would have a tendency to loosen and give permeability thereto, so as to allow the rain to pass freely through the soil, and, at the same time, make it easy for the roots to spread. This is just the soil we are attempting to form when we prepare the border, as directed under the proper head. In Massachusetts, I suppose such a soil will rarely be met with, and a prepared border must be resorted to.

A benefit to be derived from the top-dressing of stable manure and guano, according to Mr. Hovey, is, that the roots are thus brought to the surface, "rather than that they should go to the bottom after the dead carcasses." These dead carcasses appear to be a great bugbear in our friend's path, and one would suppose, by the dread in which he stands of them, that the bunches of fruit, instead of having their usual bloom, would be ornamented with hogs' bristles, horses' hair, dogs' teeth, and other curiosities. How long does he suppose this carcass retains any appearance of what it was when placed in the border? In Massachusetts, and south of this, if placed there during any time but the winter months, in sixty days every vestige of the body will have disappeared, excepting the bones, horns, hoofs, and hair, and will have become incorporated with the soil and enriched it to a great degree. The bones, being at the bottom, will remain according to their size and age, from one to fifty years, continually and very slowly decomposing. Mr.

Hovey wishes to keep the roots at the surface, and this he will do by the top-dressing.

In the directions for the winter treatment of the vine, it was recommended to cover the border with coarse manure and leaves, so that all the advantage the vine would derive from this application would be reaped by following my plan; and, when fire-heat was used in the spring, it is urged, as proper, to add to the litter, etc., already on, enough of new manure to cover the border twelve or eighteen inches thick, which would ferment and heat, and certainly encourage the roots to keep to the surface. But does any one suppose that all the roots of the vine,—a plant that will live for centuries,—are to be kept within such a limit? This bugbear of the carcasses, (I am not so particular about the flesh being on them, it is the bones and hoofs I depend upon chiefly,) which trouble Mr. Hovey so much, and which are to draw the roots of the vine down to them, (it is admitted then that there is such nourishment,) I place there, at the bottom of the border, the lower part of them three feet and the upper part, perhaps, not more than two under the surface, to give durability to the border, presuming that the vine will not reach them before the second, third, or fourth year, and that, when it does, by the superior richness of this strata, the roots are effectually prevented from going deeper in search of food; it is well known that the roots of the grape will form spongioles innumerable over the surface of bones partially decomposed, and that they turn and return, on the inside and outside of them, having no disposition to part company.

The cause of Mr. Hovey's objecting to these materials



being at the bottom is the very reason why I place them there. He thinks it will draw the roots from the influence of the sun and air. I think it will prevent them from going so deep as to be out of this influence; and at a medium depth, they will be less exposed to the changes of the weather, and enjoy a more equal temperature, as well as be less liable to suffer from drought.

Mr. Hovey covers his border, after planting, with a little coarse manure, and, if the weather prove dry, he waters the border.

In April, before the manure, which was put on to protect the roots, was dug in, ten or fifteen pounds of guano was spread over it.

In June, the border was mulched with coarse manure and watered. The 30th of June, after refreshing rains, which had washed this manure, and soaked its juices down amongst the roots of the vine, the "grapes swelled their berries very fast," showing conclusively the benefit of the manure. All Mr. Hovey's statements go to prove the value of a rich border. His border, it is true, has no beast, in its original form, therein, but it is composed of the top soil (the cream) of an old pasture, stable manure, and ground bones, (this last material, I think, should come under the head of *quackery*, particularly as, in the ground matter, much of it comes immediately into action,) with the addition of the guano as a top-dressing. The soil was new, and was well manured with substances in which it is well known the grape will flourish, and the vines were not planted near together; they were in a fine house and undoubtedly judiciously treated; and, if the plan of adding strong stimulating manures, such as

guano, bone-dust, or the carcasses of animals, perfectly decomposed, (I do not care which, the effect, in either case, will be the same,) be continued from year to year, I see no reason why they should not continue to prosper. The border can, at any time, be made wider, if necessary. If these applications are omitted, I have no doubt that, in a few years, the fruit would deteriorate. In the border prepared with the materials of oyster shells, bones, dead horses, cattle, and slaughter-house manure, as detailed in my plan, the vines, if well treated in the grapery, would continue to fruit well for fifty years or more, without the application of guano, etc., or liquid manure, the application of which is quite as offensive as any of the prohibited articles ; and guano, if dissolved in water, and suffered to remain exposed to the heat and sun in the grapery, is more so than any substance I have recommended, proving that it contains all these disagreeable materials, if you choose to bring them into action, and select that time to apply them to the border. Any one may satisfy himself of the truth of this assertion, by taking a few ounces of the guano and mixing it with a quart of water and exposing it as above named. If this is the case, all the bad effect of strong manures upon the flavor of the fruit must follow the use of this substance as well as of the before-named. That it does have this effect, I do not believe. Before these substances will be used to nourish the vine, they must be chemically changed ; before this is done, they are a poison ; and, it in sufficient quantity, will destroy life in the roots which are exposed to them. It may be said that guano is already changed ; that it has laid exposed for years to the

weather. It is not so changed but that it may be still more so, and it is yet capable of fermenting and heating. It is not unusual to find parts of, and even whole, birds, more or less decomposed in it.

It is no objection to the use of any substance, as a manure, that there is a certain time or stage in its decomposition when it is offensive. It is so with any substance; and if you choose first to bring the material into this state and then to apply it, it is your own fault. Even leaves and the young shoots of the vines, if allowed to ferment and become putrid in a tank, are as much so as any manure; and when the liquid from these is applied to the roots of the plant on the inside of the house, there is nothing more offensive, or that retains the odor so long. But this is no evidence that the liquid is injurious, or any reason why it should not be used, but it is a hint to the cultivator to apply it before it becomes thus offensive.

Mr. Hovey uses, in his border, the richest soil or loam, and adds stable manure, ground bones, and guano, with liquid applications in seasons of drought, in summer, after mulching the border.

I use a good loam, with a large supply of whole bones and other manures, but also a good portion of shells and old bricks and mortar, and do not apply liquid or liquid manures to vines thus situated. Thus, it appears that, if the one has a rich border, the other does not differ materially from it.

To make this discussion of any benefit to the practical gardener, it is necessary that he should read the whole matter and hear both sides, and judge for himself what is best for this purpose. I have quoted all the articles

from the Chronicle, and, to express my own opinion upon the question raised, I have appended notes to the different suggestions, as occasion seemed to require.

“*Questions for Vine Growers.*—Being near the residence of a celebrated grape-grower, (whose name it is unnecessary to mention,) I had a great desire to pay him a visit. I learned, however, that Mr. ——— was not at home, but was invited by an assistant to look round the place. We proceeded directly to the vineries, in which I found the vines healthy and vigorous; they were old established vines, and were producing a very full crop, particularly some Cannon Hall Muscats. Proceeding onward, however, to some newly erected houses, in which the vines had been planted last February, I found the young shoots all dead for eight and ten inches back, and some even more; and, for the cause of this calamity, I could not obtain a satisfactory explanation, the blame being laid upon the sheet glass with which the houses were glazed. Upon inquiring of what the borders consisted, I was told that they had received a large admixture of dead carcasses, such as those of deer, horses, &c., and of bones. On more recent inquiry, I was also informed that the death of the young shoots was caused by the flue running four times through the back walls; but I know of no case of this kind ever having occurred before.” (The writer then says, neither the glass nor the flues can be the cause of it.) He adds, “I conclude the malady has arisen from putrefaction in the border; for, while these carcasses are in a putrescent state, noxious matters must arise, which have proved a baneful stimulant to the tender roots. I feel interested in the case,

and shall take it kind should any correspondent furnish me with an opinion on the subject. If the evil originated from carrion, (as in all likelihood it has,) writers of treatises would do well to first prove its good effects before they so highly recommend such matters to the public."—*Robert Elliott, Horn's Castle, Nov. 24th, 1847.*

"(We have always discountenanced the use of carrion in this manner. The vines are probably poisoned."—Editorial remarks.)—*Gardeners' Chronicle, 1847, page 798.*

At the rooms of the London Horticultural Society, December, 1847, were exhibited from probably the above gardens, (by Mr. Roberts,) Muscat of Alexandria, and two other sorts of grapes, for which the Banksian medal was awarded.\*

Robert Errington, of Oulton, recommends covering the grape border with barn-yard manure two feet deep, over the whole extent of it in the month of October. Mr. Roberts objects to this at that season of the year, and says it should not be done until the time of forcing approaches. Mr. Errington "is a great opponent to the burying of carcasses, or any part of them, in borders," and refers to the remarks of Mr. Elliott, and attributes the injury of the vines to this cause; but it does not appear that he was personally knowing to the facts as stated by Mr. Elliott.

"*Vine Culture.*—On looking over the *Chronicle*, of

\* That Mr. Roberts, and the vineries under his care, were the subjects referred to in the above communication, has since been denied; but no one can censure him for applying the article to himself, particularly when the concluding sentence is considered.

December 4th, I noticed a communication from a Mr. Robert Elliott, headed, 'Questions for Vine Growers,' and, as I am evidently the person he alludes to, I beg to offer a few remarks on his visit to Raby, if he, indeed, visited Raby at all; for the whole of my men disclaim all knowledge of ever having shown this Mr. Elliott through the place in my absence. From the remarks he makes respecting the vines here, I assure your readers that I should not have troubled myself to refute him, had I not had a work before the public, from the following of which, to the letter, I have had unerring success; and, if I cannot convince your readers that the greater part of Mr. Elliott's letter is a tissue of falsehoods, I will suffer my treatise to fall as my contemporary's brick pillars have done."

In reference to the vines in the old houses looking well, and having good crops, as stated by Mr. Elliott, Mr. Roberts says, that it is owing to the disbudding and top-dressing the border with carrion, &c., and, wherever practicable, applying heat to the roots. He then goes on as follows:—

" 'Proceeding onward, however,' Mr. E. remarks, 'to some newly erected houses, in which the vines had been planted last February, I found the shoots all dead for eight and ten inches back, and some even more; and, for the cause of this calamity, I could not obtain a satisfactory explanation, the blame being laid upon the sheet glass with which the houses were glazed.'

"Now, in this range, during February and March, there were planted, inside and outside, upwards of one hundred and thirty vines, chiefly small plants, and through



the whole range, when he saw them, (if he ever did see them,) there were not thirty vines stopped at the points of the shoots, as he describes, and those so stopped are entirely confined to the roof vines planted outside, which is my favorite method of planting. As to the glass being injurious, this is rather a grave question, which ought to be guardedly advanced. But I, in a great measure, believe in the purport of Mr. Spencer's letter to the Chronicle some time ago, though it was stated that the glass was not in fault. I warn my brethren and amateurs to be guarded as to the too free use of it.

“‘Upon inquiry,’ continues Mr. E., ‘of what the borders consisted, I was told they had received a large admixture of dead carcasses, such as those of deer, horses, &c.’” and, in the remarks appended to Mr. E.'s letter, the editor says, ‘We have always discountenanced the use of carrion in this manner. The vines are probably poisoned.’

“It may, perhaps, be in your recollection, and I dare say in that of many of your readers, that a collection of grapes was submitted by me, in September, 1841, to the Horticultural Society, which was the produce of young vines. The borders in which they grew contained carrion, &c., as detailed in my treatise; and until I find the specimens then sent superseded, I will still carry out and recommend the use of carrion when it can be obtained. But how can your position be tenable, when I tell you that the vines mentioned by Mr. E. are not planted in carrion, and that no carrion has been near them, not one horse carcass, nor a portion of one, is buried in the whole of my new borders, which are extensive?

I was sorry at the time I made them, that it was not in my power to avail myself of that pabulum to produce the nectar of Bacchus. All the carrion, of any description, they contain, would not have made one load for a Shetland pony, and most of that was reduced, in order that it might give out immediately nutritious food to the vines, young as they were when planted, had it been placed within their reach ; but it was not. In notices to correspondents, it has been stated that my method of preparing borders was good, but too much azotised.\* The vine borders at Bishop's Stortford, are stated to be gorged with manure and fleshings of skinners and tanners, and no caution is given regarding the too free use of azotised manure, which is the basis of good cultivation. An immoderate use of such azotised manures, as a thorough mixture through the soil, will be far more likely to prove poisonous to vines in their infant state, and far more injurious than anything I have yet offered to the public as essential to the good culture of the vine. But if I was not able to add carrion, except in a very limited degree, at the time my borders were made, I may mention that I fell in with a goodly lot last winter, part of which has been added as a top-dressing this autumn, and I intend in future to apply it to that purpose. I am so cautious that the least particle should not be wasted, that I hoard it up as a miser would his gold. I hope the matter is here set at rest as regards carrion poisoning vines. 'On more recent inquiry,' says Mr.

\* Azote or nitrogen;—this gas exists in all animal substances, and in such plants as putrefy with an animal odor, such as cabbage and mushrooms.

Elliott, 'I was also informed that the death of the young shoots was caused by the flue running four times through the back wall. All this Mr. Roberts denies.' I beg to tell Mr. E., when my treatise appeared before the public, I had proved the value of carrion, and I have been in the habit of using it for twenty years back, the results produced by which have been surprising and permanent."

"My new borders are formed and composed of materials nearly to my wish, with only two exceptions: there is too little carrion with too great a portion of another constituent in the soil, in excess, but I hope to be able to subdue this last to my mind. With the above exceptions, I am convinced from what little I have made the habit of the vine my study, that the border contains what is required for its perfect development and fruitfulness, etc."—*James Roberts, Raby Castle, December 13, 1847.*

"(We cannot find that Mr. Elliott has said one word about Raby in his letter. Had he done so, we should have waited for further information before we inserted it."—Editor's remarks.)—*Gardener's Chronicle*, 1847, page 837.

"One of the best modern writers on the vine is Mr. Roberts, now gardener to the Duke of Cleveland, at Raby. His Treatise on Vine Culture contains more really good advice, and sensible suggestions as to the way in which this plant should be managed in vineries, than all the English books of routine, which had been previously published, put together. His success as a grape grower, while gardener to Mr. Matthew Wilson, at Eshton Hall, was a brilliant example of the general

soundness of his principles. A large silver medal, which was awarded by the Horticultural Society, to some bunches of grapes, exhibited September 7th, 1841, sufficiently attested the advantage of his practice; nor were they a picked sample, but a fair gathering from the vineries under his care, as we happen to know on the very best authority.

“It is therefore with no ordinary reluctance that we venture to question a part of the system which Mr. Roberts advocates. We allude to the employment of carrion in his vine borders.\* In a letter which we published

\* The improper use of the word “carrion” by Mr. Roberts has been the cause of this controversy or discussion, so far as the English writers have participated in it. In his rules for making the border, he calls it by this name, when he is giving directions to have the substance procured. In placing it in the border, he adds, “Not bringing it to the surface within one foot, as its assistance is not wanted the first year.” Thus it will be seen, that it is not putrefying flesh, carrion, that he gives to the vine as food, but the decomposed matter and the bones, which may be properly termed a manure, composed of loam, or soil, and decayed animals. Another error, I think, of Mr. Roberts, is, his not directing that this flesh of animals be used when fresh and sweet, and the disagreeable consequences attending the removal of it, as described by him, would be avoided. If it must be collected, before making the border, then let it be done a sufficient length of time before removal, to insure its decomposition. What that time may be will depend upon the climate and the season of the year. Near the equator, a few weeks would be ample time for even the bones to decompose. In England, it would probably require the whole summer for the flesh and sinews to dissolve. At my garden in Salem, Massachusetts, a very fat hog, that had died from excessive heat, in August, was placed just under the ground, and covered with the soil, with the intention of removing and scattering the remains on the border in the fall. In sixty or seventy days, the place was opened, and not a bone even could be discovered. The only vestige of animal remains that could have been part of the creature were some teeth, and they may have been in the soil before. The rapid decay in this case, no doubt, was owing to the excessively fat condition and age of the hog, which was only six or eight months.

last week, he states his conviction that this sort of manure is of the first degree of importance. After mentioning that, in his new vine borders, not one horse carcass, nor a portion of one, is buried, he expresses his regret that, at the time he made them, it was not in his power to avail himself of that 'pabulum to produce the nectar of Bacchus.' 'But,' he adds, 'if I was not able to add carrion, except in a very limited degree, at the time my borders were made, I may mention that I fell in with a goodly lot last winter, part of which has been added as a top-dressing this autumn, and I intend in future to apply it to that purpose. I am so cautious that the least particle should not be wasted, that I hoard it up as a miser would his gold.'

"This is perfectly consistent with the directions which Mr. Roberts has given in his treatise."

[For these, see Mr. Roberts's border; it is unnecessary to repeat them here.]

"It cannot be denied that this is a process which must not be called inviting. Has it any disadvantages? Has it any advantages? These are both very important branches of inquiry. It may be alleged that it can have no disadvantages, because the magnificent grapes, above referred to, were obtained by it. But we are ignorant of the history of those vines since 1841, and this point it would be desirable to have elucidated. In the next place, it appears to us that the introduction, into vine borders, of pasty masses of matter, such as result from the use of carrion, is at variance with the first principles of vine cultivation, the truth of which was known even to the Romans.

*A free LOOSE earth is what the vines demand,  
Where wind and frost have help'd the lab'rer's hand  
And sturdy peasants deep have stirr'd the land.*

“This was the maxim of Virgil, and all theory and experience prove its value. Then there are the gaseous results of decomposition, whose putrid odors render vine borders, constructed on Mr. Roberts’s plan, so intolerably disgusting. Can any one seriously believe that such an agency is desirable? That it is even suitable? Certainly we are not among the number. It is perfectly well known that azotised manures in a state of high concentration, are injurious or destructive to vegetable life; as is proved sufficiently by the effect of certain animal matter, when thrown upon grass land; or as we have just now evidence of before our eyes, in the form of a large oak tree which was almost killed a few years ago, in consequence of the contents of an old cesspool having been dug into the ground about its roots. It is only when diluted that such manures acquire the high value which belongs to them. But it is not alone by their direct action, that they affect plants injuriously; the putrid gases which they give out, are destructive to the young stems and foliage of plants, in proportion to their strength; such gases are, up to a certain point, absolute poisons, although, below that point, they are nutritious. It is not very long since, that plants, in a small greenhouse, were almost destroyed in consequence of a dead hedge-hog having been allowed to putrefy in it; and it appears, from Mr. Roberts’s statement, that some of his young vines, about thirty, are dead at the ends; those thirty being ‘entirely confined to the *roof vines* planted out-



side,' precisely those which the light gaseous products of the rotten carrion, used in neighboring borders, though not in their own, would be most likely to affect. Mr. Roberts, however, is not inclined to refer the bad condition of his vines to any such cause; but he hints at the glass being possibly in fault. He also refers to Mr. Nash's admirable vine borders at Bishop's Stortford, which 'are stated to be gorged with manure, and fleshings of tanners and skinners,' and compares them, as we understand him, with his own. But, in truth, there is no analogy. Not a particle of carrion was employed there. Such animal matters as skin, hair, and trimmings of hides, decompose very slowly, and are not carrion any more than bones are. It is the animal matter which rapidly becomes putrid, and passes off in clouds of poisonous gas, that renders carrion, properly so called, objectionable.

"The vine-dressers of France object to manure altogether. Virgil, to be sure, recommends it in some lines, which should be committed to memory by every young gardener :—

Next: when you layers in your vineyard make,  
Mix some rich dung, and shells and pebbles break,  
Spread the good soil with lib'ral hand around,  
And trench them deeply in the lightened ground;  
Superfluous moisture thus glides through the earth,  
And healthy vapors aid the tender birth.

"No doubt, these are wise maxims. No modern discovery is at variance with them; on the contrary, they are confirmed by the experience of the most intelligent cultivators. The whole aim of the poet is to inculcate the necessity of keeping the soil loose. Dung may be

used, he says, but then you are to mix it with *shells* and broken pebbles, the object of which is to secure the constant openness of the soil.

“On the other hand, Chaptal, the best French writer on the vine, discourages the use of manure.

“‘The same reasons,’ he says, ‘may be used against the system of the vine-growers of the north, who think it advantageous to manure their vines. By this means, indeed, they obtain larger crops, and more wine, but it is of bad quality, it will not keep; and its smell *often reminds one, when drunk, of the disgusting substances which produced it.* Manure communicates to the vine too much nourishment. The nutritious juice, reduced to gas, and received by the mouths of the capillary roots, and by the air-vessels of the leaves, penetrates and circulates in the sap-vessels, forms the wood of the plant, and furnishes the substance out of which the shoots, leaves, flowers, and fruit are developed; the more abundant the nutritive matter, the more the diameter of the vessels distends, the more rapid is the circulation of the sap, because the channels through which it passes have more capacity. This causes the sap to circulate in a less state of elaboration, the result of which must be, that the wine is flat, insipid, and destitute of all the principles of alcohol. *Nevertheless, the abundant crop thus obtained, and the brilliant vegetation, are, after all, in some measure deceptive,* FOR THEY CAN BE BUT TRANSITORY. In vineyards where manuring is practised, they only manure once in ten years. It is not to be doubted, that the effect is very remarkable the first three or four years after the manuring of the vines, *but, in the succeeding years, the*

*plants begin to languish* ; no longer finding that abundance of nourishment to which they have been accustomed, they suffer in consequence, and often fall victims to the want of it. Thus a part of the plants are lost, either by too much or too little nourishment. But vines can receive, and it is often advantageous to give them, such manure as will make good the poverty of the soil, its exhaustion, or what is required otherwise for this sort of cultivation. No manure suits vines better than what is properly called vegetable earth, obtained by the decomposition of plants. Mosses, leaves, and turf, mixed together, thrown up in great heaps, and left for about two years to ferment, make the very best manure of this sort.—(*Traité sur la Culture de la Vigne*, i., 333.) [Further extracts from Chaptal may be found under the head of manures.]

“We will not say that these maxims are exactly applicable to English vine-growing ; we seeking fine bunches of grapes, the French requiring juice of fine quality ; and we are, therefore, ready to concede the value of manure of a proper description. Nevertheless, although we fully grant this, we are not the less of opinion, that the effect of manure on vines is overrated, and we will take the liberty to quote Mr. Roberts’s own Eshton grapes in our support. He says, ‘it may be in your recollection, and in that of many of your readers, that a collection of grapes was submitted by me in September, 1841, to the Horticultural Society, which was the produce of young vines. The borders in which they grew contained carrion, &c., as detailed in my treatise, and, *until I find*

*the specimens then sent superseded*, I will still carry out and recommend the use of carrion, when it can be had.'

"We find that the weight of grapes exhibited on this occasion, was as follows, one bunch in each case:—

Canon Hall Muscat,	-	-	2 lbs.	3 oz.
White Nice,	-	-	7 "	12 "
Black Hamburgh,	-	-	2 "	5 "
Black Prince,	-	-	2 "	15 "
Black Damascus,	-	-	1 "	11 "
Black Morocco,	-	-	2 "	7 "

and the bunches were beautiful. But we have also before us, the following memorandum, to be found in the 'Journal of the Horticultural Society,' vol. 11, p. 303.

" 'On the twenty-first of August, 1847, the vice-secretary received from Mr. Abel L. Gower four bunches of grapes; one a Muscat of Alexandria, weighing two pounds nine ounces, and the others Black Hamburghs, weighing, respectively, two pounds nine ounces, three and a half pounds, and five pounds. The Black grapes were rather deficient in color, but of very large size, and excellent quality.'

"Now it will be observed, that the smallest of these bunches weighed more than Mr. Roberts's Black Hamburgh, and the largest *more than twice as much*. And how did Mr. Hutchinson, the gardener at Castle Malgwyn, obtain them? By carrion, or any such violent and disgusting materials? Not at all. He states that the compost 'used in the formation of the border, was hazelly loam with its turf, three parts, and one part brick, lime rubbish, and broken stones, with a little rich old dung, the turf well rotted, and the whole well incor-

porated; the borders are forked up and watered with liquid manure once a year.'

"Mr. Roberts will thus see that his fine Eshton grapes are 'superseded;' are, in fact, beaten by specimens more than twice as good, and that by the use of simple, inoffensive means, which, moreover, do not render a garden more pestilent than a London churchyard, and so dangerous to health, that it would be infallibly indicted, if it existed within the reach of any sanatory regulations. Should Mr. Roberts remain unconvinced by these arguments, we would, at least, endeavor to persuade him to defer the use of carrion till the coming cholera shall have quitted us."—*Gardeners' Chronicle*, 1847, p. 851.

In the *Chronicle* of January 1st, 1848, page 5th, is a denial of Mr. Robert Elliott, of any allusion to Mr. Roberts, or the vines at Raby Castle, in his article quoted as from this paper, page 798, for 1847.

"Mr. Roberts did not leave Eshton Hall till May sixteenth, 1844. I went on the fifteenth of the same month, and found the vines in a good growing state, with plenty of grapes on them, and they still remain in good condition. I have, on the rafters thirty-four vines and on the back wall thirty, in all sixty-four vines, each of which produces, yearly, twenty pounds of grapes.\* My

\* I have often been asked, why I limit the crop of grapes for the vine, at twenty-five pounds. English writers upon the subject speak of much larger crops, we find; and, even by your own account, the Hampton Court vine ripens its two thousand bunches. This is all true, but it is no reason why your vines, which have been planted only three feet apart, and are allowed less than eighteen inches on each side of the main shoot for its branches and fruit, should carry the crop that the Hampton Court vine does, which has a great space of soil for the roots to roam in, and the

plan is, not to allow a vine to bear more than twenty bunches of grapes, which swell finely, and we might travel a long way ere we met with vines to match those

roof of an entire house, seventy feet long, and proportionately wide, for the branches to ramble over. Again, this vine, and some others, mentioned under the head of remarkable vines, are exceptions to the general bearing of the foreign kinds of the grape, favorably affected by some peculiarity in their location, which it is not likely will be the case with the vines in your grapery. Perhaps the difference in the amount of fruit produced may not be so great as you suppose. If I am correct in the length of the house for the Hampton Court vine, which produces the two thousand bunches, the same length of house would contain, by my system, twenty-three vines, and twenty-five pounds each vine would produce five hundred and seventy-five pounds. The same number of vines on the back wall would produce, if well managed, certainly half this amount, or a total of eight hundred and sixty-two pounds of grapes, the quality of which could not well be surpassed. The two thousand bunches on the Hampton vine, at the time I saw them, would not average more than half a pound each, or one thousand pounds. I have seen it stated, that this vine has produced one ton of two thousand two hundred and forty pounds of grapes in a season. This may be so, but of the quality of this fruit we know nothing. I am endeavoring to show what a vine will do, *every year*, if treated as directed. In saying that twenty-five pounds is all that a vine should be allowed to bear, I do not wish to be understood as meaning that a vine cannot, under any circumstances, occasionally produce a much larger quantity; the account I so soon give of the vine at Hampton Court bearing such a crop, is proof enough that I hold no such opinion. What I presume to be wanted of a vine is, a certainty (as near as human agency can effect this,) of a liberal and annual crop of fruit, in quality as rich as it can be grown under the circumstances of situation, &c. This, I believe, can be obtained by the system recommended and adopted by myself; and I can assure my readers, that they will, after a few years of experience, agree with me in the opinion, that twenty-five pounds of such fruit on every vine, (favorably situated,) for many successive years, is not a bad crop. On the back wall, or under circumstances not admitting of a full crop, the judgment of the cultivator must be exercised in ascertaining what is the proper amount in these cases; it will, probably, range from five to fifteen pounds.

By limiting the crop to this weight, I do not adhere strictly to just this amount; it would be absurd to attempt it. Before thinning the berries, I



at Eshton. I have this year, obtained eleven prizes for grapes, at three shows, and, last year, seven prizes at two shows. In fifteen years, I have received sixty-four prizes

reduce the number of bunches to what I suppose, if well filled out, would make this weight. It would be useless, if after the estimated weight had ripened its seed, and it was ascertained that, from the vigor of the vine, the bunches would swell and exceed the amount required, to cut off the excess now. When the grapes have thus perfected their seed, and are swelling off and changing color rapidly, and the bunches are larger than was expected, to lessen this excess of quantity, if it can be done without injuring the bunch, I thin out the berries still more, that all the nourishment may be thrown into those remaining. The effect of this treatment will be to keep the vine in perfect health and vigor. If, under these circumstances, the bunches and berries swell beyond my calculations, and the weight of fruit produced exceed the rule, there is no harm done, for the vine, from its strong condition, has produced this result. I have thirty pounds, and perhaps more, on a few vines, at this moment; the bunches which I thought would weigh one pound exceeding this weight considerably; but some other vines have less than the allowance. Nor do I expect any loss of crop next year, in consequence; for, had the vines not been in superior condition, and able, without weakening them, to have done this, the berries would not have swollen in the manner they have, and the twenty-five pounds would have been the yield. If the vines had been just coming into bearing, and six or ten pounds the required amount, I should have been very careful to avoid an over crop. Strengthen your vines during the first five or six years of their growth, after planting in your border, by not allowing them to produce heavy crops, and keep them ever after in this condition of strength, by aiming for a moderate yield of fruit. By so doing, your plants will be in the state to afford this nourishment, and the bunches will enlarge to an extent that will surprise you; on the other hand, if they are over-cropped, they will (may they have been ever so promising at the beginning of the summer,) remain with the berries small and loose, and entirely surpassed in weight and every desirable quality, by the neighboring vine, whose bunches, in the earlier part of the season, were cast quite into the shade by these.

By the statements of gardeners, who have given accounts of the crops they have produced on their vines, it would be supposed that fifty pounds was an AVERAGE yield. (I am of opinion, that the weight in these cases, was estimated, not real.) Admitting this weight to be real, then the yield from the seventy feet house, (the vines planted as is customary in England,

for grapes. Mr. Roberts and I do not essentially differ in the treatment of the vine. I agree with the maxims laid down in his book, with one exception, viz., the car-

four feet apart.) would be, on the rafters and back wall, twelve hundred and seventy-five pounds, about one third part more than would be produced by my plan. If, as stated above, my vines are capable of producing a larger crop, the berries and bunches will swell proportionably, and the average will be greater, bringing the difference to less than one fourth part.

The vine trained as the Hampton Court one would cover all the glass, and it would be useless to attempt to grow grapes on the back wall; the wood would not ripen sufficiently, and, in consequence, would not produce fruit. If space were left for the sun to shine on the wall and to ripen the wood, the crop would be lessened in proportion, on the rafter trellis. Mr. Cherry (see his statement of the vines, at Eshton Hall,) limits his crop, per vine, to twenty pounds on an average, back and front vines alike. His object, unquestionably, is, to produce high-flavored fruit, and he is the only English gardener, that I remember to have read, that speaks of so small an amount, and whose practice, in this respect, makes any approach to the product of the vine in the most famous districts of grape culture, on the continent of Europe. I have, sometimes, when a vine has been over-luxuriant, allowed it to ripen one hundred bunches, to check its excessive growth, and with the desired effect; but this was with the very strong growing kinds, as Verdelho and Black Portugal; it would have been seriously injurious to most varieties. Frequently, I have been requested to go and see vines loaded with fruit, and have found forty or fifty large bunches on a young vine; they were always looking well until after the seeding time, and then came the shrivel and shanking, and another disease, the effect of over-cropping, in which the berries have a soft, cold feeling when touched, just as they do when shrivelled, but no appearance of this on the stems. The fate of these grapes has always been similar, the loss of two thirds or three quarters of the fruit, with scarcely a decent bunch. In Hovey's Magazine of Horticulture, vol. 4, New Series, at the 277th page, is an article on the grape, taken from the Gardeners' Journal, 1848, p. 182, in which the writer's object was, as he states, to do justice to a Mr. Gerrie's good management of the vine. As I am a disbeliever in the vines annually producing forty or fifty, or, as some writers say, sixty and eighty pounds of fruit, for any length of years,—and as this gentleman furnishes one of these wonderful stories, and also supplies the facts contradicting his own statements, and, at the same time, gives confirmation to my opinion expressed before, that these weights are, usually, by estimation, and not by actual

rion. For a border, I like fresh sods, and dung in a fresh state, say six cart-loads of good sods, one cart-load of leaf mould, and one cart-load of horse-droppings.

balance, and will show to the inexperienced in these matters, how easily people may be deceived, when they do not calculate for themselves, and how readily such a statement, after once being in print, is circulated without examination,—I shall quote a large part of it here:—

‘ Both houses were planted in March, 1846. The vines grew finely the first season, making strong wood, short-joined, and well ripened; they were pruned to about half the length of each rafter. Forcing was commenced in both houses, on the tenth of February, 1847. I saw them in August following, and a finer crop, or better fruit, I never witnessed, as far as they were pruned. The bunches were large, the berries well swelled, and all a good color, not one of them being shanked. The greatest number of bunches on one vine, was twenty-six, the least number, fourteen. The weight of the bunches was from one pound to two and a half pounds each; the entire weight being nearly three hundred weight, from the thirty vines, with which the houses were planted. This, your readers will say, was a surprising crop for the second year after planting, and so, no doubt, it was; and now comes a very important question. Was it prudent, on the part of Mr. Gerrie, to allow so many to remain on the first season? and was he justified in so doing? The result showed that he was. The vines did their duty nobly. He was aware that the material in which they grew was good; the wood was strong and well matured; and he judged, therefore, that he might allow them to produce the above quantity.”

Upon the propriety of fruiting vines thus early, I have expressed my opinion, under the proper head. It will be noticed, that this writer states, that the greatest number of bunches on a vine was twenty-six, the least number fourteen, and that the bunches weighed from one pound to two and a half pounds each. He then adds, the entire weight being nearly three hundred weight, from the thirty vines; thirty vines, at twenty-six bunches each, would give a total of seven hundred and eighty bunches, and the mean weight, per bunch, he gives, (one pound to two and a half pounds each,) is one and three quarter pounds, or, a total of thirteen hundred and sixty-five pounds. Again, thirty vines, at fourteen bunches each, would give four hundred and twenty bunches, which, at the mean weight of one and three quarter pounds each bunch, would give a total of seven hundred and thirty-five pounds; showing the crop of fruit, according to his own statement, as ranging between seven hundred and thirty-five and thirteen hundred and sixty-five pounds; and yet he says, the entire weight was

GEORGE CHERRY, Eshton Hall."—*Gardeners' Chronicle*, 1848, p. 22.

"It appears that we were not far wrong, when we ventured to express a doubt as to the permanence of the vigor produced in vines, by the use of carrion, (see page 851, 1847.) Mr. Cherry, the gardener at Eshton Hall, himself objects to it, and, although he describes the vines there as still remaining in good condition, yet admits that the weight of the bunches does not now exceed one pound on an average, yet they have been out of Mr. Roberts's charge for only three years. This is a sad falling off from two and a quarter pounds a bunch. That they are still in good health and very respectable vines, we fully believe, for they continue to be managed upon Mr. Roberts's plan, which we regard as excellent, with the single exception of the carrion."

"What the effect of using carrion in vine borders really is, appears pretty clearly from the following statement, which has just reached us :"—

about three hundred pounds, or ten pounds per vine, instead of from twenty-four and a half to forty-five and a half pounds, as by the statement of bunches and their weight. If the number of bunches on each vine was correctly stated, instead of weighing from one pound to two and a half pounds, they only weighed from six to twelve ounces, or the average weight of about half a pound each. Very small bunches indeed. As to the vines maturing this ten pounds of fruit, the second year, there is no improbability in that, and it is not unlikely that they may have borne respectable crops of fruit for several years, but I do not think they would compare with vines differently treated, after they were five or six years old.

If any one should prefer to plant but one vine in a grapery, and train it after the manner of the Hampton Court vine, he should proceed upon the principle, that he was establishing a tree, to remain for centuries, and should not allow it to fruit until it had been planted for five or six years, and had become well established. I believe, however, that the amount of fruit obtained, would be less, annually, after waiting thus long, than by the mode of planting many vines.

“Some years since, I took charge of a place where there were three large vineries, the grapes of which had entirely failed. The vines had been planted about six years. Upon examination, the borders proved to contain the carcasses of thirty fat hogs, which had died of murrain, together with the bodies of other stock. They likewise contained three or four wagon-loads of large bones, and an immense quantity of woollen rags, saturated with oil. Upon digging into the border, I found the soil more like paste than any thing else, and the stench was so dreadful that one of the men was taken ill from the effects of it. Throughout the whole of that border, I found not one single fibre; the large roots were covered with canker, and several large ones were eaten completely through. The foliage was very large, but sickly, the wood very long-jointed and watery. I commenced forcing one house of Black Hamburgs early; the temperature was kept low, with abundance of air; the vines broke slowly and strong, but showed scarcely any fruit, generally throwing off a tendril instead of a bunch; the other houses were also indifferent, both in flavor and color, being watery, and insipid to the taste. At that time, I had not made the above examination. Afterwards I added one third of old mortar and brick rubbish, and, having well mingled the whole, I replanted the vines carefully; the result was, that, the following season, the wood became firmer and short-jointed, and the crop improved, both in weight, flavor, and color.—E. F. G.”\*

\* E. F. G. states impossibilities; and, to practical men, renders thereby his communication worthless, unless they can be accounted for as oversights.



“With reference to manuring, a friend has lately communicated to us the following interesting memorandum :—

“When I visited the vineyards of Frontignan, I was much struck with the exceeding tenderness and crispness

That the editor of the Chronicle should have thought the article of value, must have been because it favored his opinion relative to the use of carrion; and he could not have given it a careful perusal: if he did, he overlooked the result of such reasoning. You might, with as much propriety, say that bone-dust, guano, poudrette, or any chemical combination, was bad and unsuitable as manure for the vine, because it would not flourish if planted in them, simply, or with only a small proportion of soil. According to E. F. G., “here was a mass of thirty fat hogs, and other bodies besides, (how many he does not say,) three or four wagon-loads of large bones, and an *immense quantity of woolen rags saturated with oil.*” (This last article of oil, unless used in the compost heap, and entirely decomposed before it is used, is, perhaps, the worst poison that can be applied to the roots of fruit trees, of all kinds.) Upon digging into it, according to his account, it was a mass of putrid matter, which would as surely destroy all life in the root of the vine which came within its reach, as fire would destroy life in the animal, if surrounded thereby. In fact, it was a compost heap, piled above the roots of the vine. (The vines had been planted six years; this heap of matter could not have been put there at that time; for, even in England, two years is sufficient for the mass to have been changed.) What practical gardener would think of planting his vines in such materials? Compare this mass of putrid matter with the soil, as recommended by Mr. Roberts; how very unlike they are!

“Throughout the whole of the border, he found not one single fibre, and the large roots were cankered, and some of them eaten through.” He does not state by what the roots were eaten; whether by worms, produced in this putrefaction, or by the canker. This is just the condition the roots might be supposed to be in, that is, dead. It is impossible to cause a root of the vine to live in such matter, during decomposition. Thus far, there is reason in what E. F. G. says, as to the condition of the border, and the state of the roots of the vines growing therein. But when he states “that the foliage was very large, but sickly; the wood very long-jointed and watery,” we cannot agree with him; it cannot be; E. F. G. must have overlooked some important fact; the roots of the vine could not, without spongioles and rootlets innumerable, produce this long-jointed wood, with



(if I may use the term) of the grapes there grown, as compared with the Muscats of our forcing-houses; and, when I tasted the Nice grape of Raby Castle, of which you were so good as to send me a sample, the idea occurred to me, that the hardness of the pulp might be owing to excessive manuring and forcing of the vine; and I thought of writing to you, to inquire if you were aware of any facts, in the history of vegetation, that would warrant such conclusion. I may mention, too, that this latter grape, though magnificent to the eye, had, to my taste, a flavor different from the ordinary Nice kind, something like what the French call *gout de terroir* in wine. That this peculiarity may originate from the foul manure that had been given to the vine, I think highly probable; and the following instance will show how easily the flavor of the fruit may be affected by substances less offensive than carrion. M. De Chassirou has observed, that the wines of the Isles of Oleron and Ré, are of bad quality, and retain the odor peculiar to the sea-weeds with which the vineyards there are ma-

large leaves. In forcing, "the vines broke slowly, but strong, and showed scarcely any fruit." Here, also, is a strange statement; the vines, to do this, must have received abundant nourishment; and such a condition of the roots, as before-mentioned by him, could not have furnished it. E. F. G. did not go deep enough into the border; if he had, (and the vines were as he stated,) he then would have found, below all this mass of putrid matter, the roots and rootlets which furnished the sap that produced these long shoots and large leaves; and these roots being so deep in the soil, is the cause why the vines did not die from the effects of the manure, and is the reason they did not fruit, the wood not ripening sufficiently. A small part of this putrid matter, if it had been changed, as it should have been, in the compost heap, and then applied as a top-dressing, would have enticed the roots to the surface, and have been beneficial, instead of destroying them as it did.

nured. In all wine countries, where we may suppose the culture of the vine to be best understood, the opinion universally prevails, that fresh manure ought not to be used, or, if it be so, that it should be applied in the autumn, after the vintage, so as to be, in a great measure, decomposed, and incorporated with the soil before the ascent of the sap, in the spring. This practice is occasionally followed in the Rheni-gau, where a strong prepossession exists in favor of manuring the vineyards,\* and where small quantities of litter are spread around the roots of the vines; but the best authors concur in recommending, that all the manure employed should be first duly fermented, at whatever time it may be used.” —*Gardeners' Chronicle*, 1848, p. 19.

“The custom of introducing carcasses into vine borders, for the purpose of obtaining monster bunches of flavorless grapes, has prevailed for a considerable length of time in the neighborhood of Leeds and Wakefield; but the vines have always, in a few years, become feeble and unproductive, in consequence of the dense mass of putrefied matter being unsuitable to the growth of fibrous roots. G.” —*Gardeners' Chronicle*, 1848, p. 37.

By James Roberts, Raby Castle. (As the remarks are long, and much of it not having any practical bearing upon the question, I shall only extract such facts as are different from those already stated.) “In page 851, it is stated, that the grapes I exhibited, on September 7th, 1841, have been superseded by Mr. Hutchinson,

\* It is here admitted that, in some wine countries, manuring is allowed, notwithstanding the assertion, a few lines above, to the contrary. (See manuring vineyards.)

gardener at Castle Malgwyn. It certainly appears that the Hamburgs sent were heavier, and, I have no doubt, others have shown heavier bunches than mine, which, perhaps, were not the heaviest in the Eshton range; but, admitting they were, do the grapes alluded to supersede them as a collection? This collection, which was exhibited in London, on the 7th September, on the 9th was exhibited at York, and took five first prizes. Surely then the grapes must have been good indeed, which, after receiving, I believe, the highest medal ever awarded for grapes, at the society's rooms in London, travelled, by coach and rail, between four hundred and five hundred miles, were packed and repacked twice, and then competed, successfully, amongst the best fruit-growers of any county in England.

“Between September 7th, 1841, and October 17th, 1843, I was awarded, by the Horticultural Society of London, eight medals, six for grapes exclusively, and two for exhibitions in which grapes formed the principal fruit. It appears that Mr. Cherry agrees with my practice of culture, with the exception of carrion; but, if he has not re-made the borders at Eshton, which I am persuaded he has not, are not the vines still enjoying the remains of what I *cautiously* offered?” Here follow some particularly correct remarks relative to the border, as described by E. F. G., page 274. As I have made my own statement concerning the materials used in this border, and the effect, as described, upon the vines, and as in the main we agree, it is unnecessary to quote them here. “In making a tour, in the autumn of 1844, I called at a nobleman's demesne. After an introduction

to the gardener, we entered a large vineyard, in which was a splendid crop of Muscat of Alexandria grapes; good bunches, with finely swelled berries, and beautifully colored. I expressed my delight at the sight, and he stated the means employed to bring about so desirable a result. The vine was worn out, and bore little; and, he added, 'being possessed of your Treatise, I top-dressed, as recommended, and the result is what you see; they have been the admiration of all who have seen them.'—*Gardeners' Chronicle*, 1848.

"We should not treat Mr. Roberts's letter on vines, in our last Chronicle, with the consideration to which the indisputable skill of the writer is entitled, if we passed it over without remark. We are also called upon to notice it by some of the reasoning introduced into it.

"Mr. Roberts first questions whether his carrion-fed vines have been excelled by others treated to a less offensive diet. That his grapes were excellent, we have repeated over and over again; they did the greatest credit to his skill, as his work on the vine does to his intelligence and knowledge of his profession. But, unti' he can show that a bunch of Hamburgh, weighing five pounds, is not superior to one weighing two pounds five ounces, or a bunch of Muscats, of two pounds nine ounces, to one of the same kind weighing two pounds three ounces,—and such are the differences between Mr. Hutchison's Castle Malgwyn grapes and those of Eshton Hall,—we must retain our opinion, that grapes are not improved by being fed on carrion. It is said that Mr. Hutchison's vines were seven years old, and those of Mr. Roberts but two; *but* we learn, by the present gardener

at Eshton, that the vines there, *now that they have become seven or eight years old*, only bear bunches averaging one pound. So that the carrion-fed vines are not improved by age; and their present state is, to our minds, anything rather than 'conclusive as to the advantages to be derived from using that substance.'

"Mr. Roberts states that some very fine grapes, seen by him in Cheshire, had acquired their condition by being top-dressed in the manner recommended by him. We find that manner explained in his Treatise, to be 'a *light* top-dressing of ground bones, loamy soil, rotten manure, and *decayed* carrion, covering the whole with an inch or two of half-rotten stable manure to prevent evaporation,'—a good appliance, no doubt. But we are at a loss to know what this has really to do with the question at issue. The use of a little horse-flesh, in a *state of decay*, is surely not the same thing as filling a border with lumps of putrid flesh. 'Adding one good-sized horse or cow carcass to every ten or twelve yards,' (Treatise,) and we certainly should not be inclined to apply to the recommendation Mr. Roberts's term, *cautious*. We own that to us the advice seems rather the reverse. But we half suspect that, after all the controversy, our difference in opinion from our very clever correspondent turns, like many other differences, upon the meaning of a word. What is really meant by carrion? We understand it to be putrid flesh in the *early* stage of decomposition, emitting putrid effluvia not less dangerous to man and plants than it is offensive and disgusting. These early products of animal decay, be they what they may, are given off in such abundance for a certain time, vary-

ing with temperature and other circumstances, that they cannot be too cautiously guarded against ; and therefore carrion, in the sense in which we understand the word, is wholly unfit for gardening purposes. But, by degrees, the horrible emanations from putrid flesh are decomposed, or absorbed by the surrounding soil, or are lost in the open air, and then their dangerous quality disappears. In fact, *decayed carrion*, that is to say, carrion which has lost its offensiveness, is not carrion at all ; it consists of little more than bones, saline matter, and the black earth which is called humus,—a very valuable substance, partly on account of its own action, and partly on account of the gaseous matters which it detains among its pores, and parts with gradually and beneficially. It is old, crumbling manure. It is not to this that we, or any one, would object. Quite the contrary ; and we readily admit that, after a time, the dead horses in the vine borders at Eshton, ceasing to be dangerous, will become a potent and harmless manure. But the mischief is done before that time ; the first stage in the growth of the vines has been injurious, and we doubt whether any amount of care will quite repair the damage. At all events, admitting that it may be repaired, we are still forced to arrive at the conclusion that the use of so offensive a material as carrion does no good, and therefore ought to be abandoned.”—*Gardeners' Chronicle*, 1848, p. 83.

*By J. W. Roberts, Gardener, Wakefield, Yorkshire.*—“Three years ago, I gardened not two miles from Wakefield, where I had two vineries, which had produced little for years. The vines in them were nearly sixty



years old. By permission of my employer, I re-made the borders. In the first place, I took the vines carefully up, and the border being in a very bad state, I drained it well, refilling it with compost, consisting of a portion of carrion, leaf mould, turf from a pasture, and stable manure, and the result is, that, last year, these same vines produced a capital crop of well-flavored finely colored fruit, and made excellent wood. Surely, this speaks volumes in favor of carrion. Is not E. F. G. mistaken, when he says that the vines in the neighborhood of Leeds and Wakefield are falling off? I have lived for nearly twenty years in the neighborhood of Wakefield, and all who have used carrion here, speak in high terms of its favorable effects on their vines. The use of carrion was first suggested to me by reading Mr. Roberts's 'Treatise on the Vine,' than which I know of no more valuable work on the subject, and for which I feel much indebted to its author."—*Gardeners' Chronicle*, 1848, p. 102.

A. Henderson is opposed to Mr. Roberts's plan, and quotes Abbe Rozier, Chaptal, M. Bosc, and other continental authors, who, it is well known, are opposed to all crude manures for the vine, as proper authorities to be relied upon as evidence of the bad effects of them. The article is very long, but it contains nothing new. It can be found in the *Gardeners' Chronicle*, for 1848, p. 115.

*Remarks on statements made in the discussion.*—The first assertion by Mr. Elliott, in the communication which commenced the controversy, is, that he found the young shoots on the vines, newly planted, all dead for eight or ten inches. And he denies that the explanation given him of the cause,—the burning by the sheet glass,—can

be the correct one, and attributes it to putrefaction in the border, baneful stimulants to the tender roots have arisen, and the effect of such stimulants, according to this writer, has been to kill the ends of the shoots. Had this supposition been correct, that the cause was putrid matter from the flesh of animals coming in contact with the roots of the vine, I have no hesitation in asserting, from what experience I have had in such matters, the result would have been death to the vine,—the roots dying first, the tops, last. I have never known a vine affected in this manner, when there was a possibility that the rich soil could have been the cause; neither do I think that, out of six hundred vines which I have planted under glass, this singular disease ever seriously affected one vine. I have had a few injured at the end of the cane, but it has always occurred on some extremely hot and bright day, when the very place on the skin of the shoot, which had been burned by a defect in the glass, could be seen. A new shoot from the terminal eye has invariably pushed and grown rapidly, showing that the cause was external, and not with the roots or sap. In the bright sunshine, I do not see any good reason why the glass might not burn the shoots in England as well as in the United States; that it does burn here, there is no doubt; and Mr. Hovey, in speaking of the exposure for the grapery, alludes to the necessity of having some protection from the scorching effects of the sun in summer, and mentions the whitening the glass for this purpose. It is not uncommon to see the young laterals, and even the main stalk of the bunch of fruit I have sometimes found burned, on the side next the glass, and so injured that I have deemed it

best to cut it away. That the gas, escaping from fermenting manure and leaves, will destroy the foliage, I have stated in my remarks on Mr. Roberts's plan.

The editor of the Chronicle states, that it is the "gaseous results of decomposition, whose odors render vine borders, constructed on Mr. Roberts's plan, so intolerably disgusting." (Article extracted as from the Chronicle, 1847, page 851.)

This state of the border, when prepared either by Mr. Roberts's plan, or my own, never can exist in fact. I never have discovered the least odor from any border after it was finished. All manures in their crude state are offensive, and, in collecting them for the border, or the compost heap, the person so employed must be subject to the gases, be they more or less disagreeable. I contend that animal matter, when fresh, is less so than any other manure. There is an erroneous opinion formed of the condition of the border, founded upon the improper use of the word carrion (before noticed) by Mr. Roberts, when he does not in reality use carrion or recommend its use until changed.

Dr. Lindley refers to an oak tree, which had been subjected to improper treatment, by the digging into the soil, around and above its roots, of an undue quantity of powerful manure from a cess-pool, with the result, to the tree, (almost death,) which any skilful gardener would have expected. This gentleman certainly cannot intend to compare this injudicious management with the compost formed from carrion and soil, and *the manner of applying it*, as recommended by Mr. Roberts. For, he immediately adds, "it is only when diluted that such

manures acquire *the high value* which belongs to them,—a just remark, not only in relation to the manure above named, but to all the substances usually classed under this head, such as the offal of all animals and birds, the decayed matter from flesh or fish, whether of the soft material which dissolves, or of the bony substances which are a long time in crumbling away, guano, poudrette, &c.

Dr. Lindley refers to the plants in a greenhouse, that were almost destroyed by the gases arising from the putrefying body of a hedgehog, and thinks that is proof that the vines were injured at the ends of their shoots by the gas from the carrion. It may have been caused by the confined air inside of this house, which prevented the escape of this gas. I must confess, that I think there may have been some other cause, that affected the plants, and produced the disease. In the newly settled parts of our country, it is customary to leave the dead bodies of animals unburied. I have never noticed any effect produced upon the foliage of tree or herb from the odor or gas arising therefrom. In the valley of the Connecticut, where reside some of our best agriculturists, they manure the land with fresh white fish, that are caught in great quantities, (I believe in the spring season of the year.) They spread them broadcast over the fields, and any one who has ridden through this district, about this time of application, can most assuredly say that the custom “is not inviting,” and can bear ample testimony that the air is charged with gas from putrefying matter, yet we hear of no bad effect from this; and, if a single hedgehog in a greenhouse would kill plants, it would ap-

pear probable that thousands, and tens of thousands, of these white fish, spread over the surface of the land, would affect the foliage in the fields wherein they were undergoing this change.

Dr. Lindley then says, "*The vine-dressers of France object to manure altogether.*" I cannot pass this remark by, without a direct denial of the assertion. The gentleman himself does it effectually in the quotation he brings forward from Chaptal, and the continuation of the subject of manures by this French author, given under the head of manures for vineyards, will still farther explain the customs of the French. My own belief is, that the French manure their vineyards: that there are exceptions to this, it may be. Chaptal, and other authors, are opposed to the custom, I admit; but other persons, who write what they have seen and know, state that they are used. Chaptal wishes to discourage the use of it, from a belief that it injures the juice of the grape; that it increases the size of the berry, he admits, and that is what all are endeavoring to obtain, when cultivating for the table, and the plan of cultivation which will produce this, without injury to the amount of the crop, flavor, or color, of the fruit, is the best.

Dr. Lindley is of the opinion, that the grapes shown by Mr. Gower, have surpassed those grown by Mr. Roberts. From the printed account of them, I should have preferred to have been the one who produced the six kinds, named as having been shown by the latter. Three of these varieties usually setting poorly, all of which were sufficiently large, and the White Nice, (a kind that makes a large bunch, but a light weighing fruit,) remark-

ably so ; they were all represented as having been beautiful. Mr. Gower's, though his Hamburgh bunches were large, were rather deficient in color,—a want that, in my estimation, would make them unworthy to compete with the first-named. To have a correct idea of this matter, there should be some standard of quality to refer to. I do not remember ever to have met with any such. My opinion of the characteristics requisite to form a fine bunch of grapes, is, that the bunch be of medium bigness, with the berries large, of an equal size, *well colored*, and covered with a fine bloom. Very large bunches are not always so equally well flavored as lesser ones, and those weighing from eight ounces to one pound each, are almost always the best. When exhibited at horticultural shows however, large sized, if at the same time these be well colored, will invariably be considered the best.

The border that produced the grapes, which Dr. Lindley considers superior to those raised by Mr. Roberts, is a very fine one, and not very unlike the compost recommended by me, to be used in a situation where it is necessary to remove all the original soil ; but, in this border, they use liquid manure ; and this is universally the case, when the border is composed of turf, without a large addition of bones or other manures. This application of an offensive liquid upon the surface of the soil is, in my estimation, more disagreeable than in burying it ; and when the rich border is properly made, rainwater is the only application requisite for the roots on the outside of the house. On the other hand, the border composed of loam and rotten sods, although excellent, requires this



application of liquid manure, to cause the grapes to swell off large and full.

This discussion of the subject of manures is well worthy the attention of cultivators. Instead of supporting Mr. Hovey's assertion, that experienced cultivators held the same opinions as he did, respecting the "quackery, so often recommended," as the use of oyster shells, or boiled bones, dead cattle, etc., I am rather inclined to believe, that the *judicious* use of them is advocated; certainly, it is admitted, that they are promoters of vegetation. Chaptal even allows, that the effect of manure is to increase the growth of wood and fruit; but, he adds, the effects are deceptive; for, after a time, the manure will cease to act, and the vine will languish. But is not this failure caused by neglecting to renew the manure? Plant a vine in a new soil, a good loam for instance, it will grow well, and bear fruit for some years, but soon (as Chaptal says of the manured vine,) it will cease to bear fruit, or only in a diminished degree. Renew this soil by adding to it more loam or manure, either as a solid or liquid, and it will regain its former vigor. The soil must be strengthened by yearly application of suitable matter. That harm is done by improper manuring, I have no doubt. If vines, when young, are too highly manured, and this stimulant is not constantly kept up, they will fail to do well; and this is what I should most fear from Mr. Roberts's system; not from the bodies of animals deposited in the border, but from the manure placed on the surface to produce heat.

Dr. Lindley, if I understand his language, does not discourage the use of the articles named by Mr. Hovey,

with the exception of carrion, and this only, as such, and not to the use of it, as I have recommended, in the formation of the border. In the last article written by him, on the subject, he says, "we readily admit, that, after a time, the dead horses in the vine borders at Eshton, ceasing to be dangerous, will become a potent and harmless manure." By the authorities quoted, and the approval of other systems of border compost, which contain manures in large quantities in them, I apprehend that Dr. Lindley, and other experienced cultivators, in Europe, do not differ widely from me, in the opinion I have formed, and in the practice which I have carried out and recommended to the public.

It must be apparent to a thoughtful reader, that, when I propose a substitute, to take the place of a soil so unsuitable as to require removal from the place where the border is to be situated, that the compost named for the purpose must be, in my opinion, in every respect, suited for the welfare of the vines. Mr. Hovey, in his sweeping remarks, relative to rich borders, refers to myself, as recommending the use of "the carcasses of animals, to such an extent as to cover the bottom of the border, if they could be obtained." His statement is correct; but my views would have been better understood, if some allusion had been made to the substitute. My reasons for recommending the carcasses of animals, are several,—such as the durability of their bones, the exciting nature and strength of the manure formed from the decomposed flesh, etc., and their cheapness. In the fall of the year, near large cities, it is frequently easy to procure the bodies of horses, either dead or living, for a

mere trifle,—often they can be had free of cost, brought to your place, and then killed, and the thanks of the owners to you in addition, for providing a place of deposit, near at hand, for them, which otherwise might occasion them some expense in their removal to a distance, or in burying them. All bodies of animals, killed accidentally, or by disease, are of no value in this country, but as manure, and when such can be had, there is so much saved. On the contrary, the land that has been skimmed of its turf, and three or four inches of its best soil, (in this part of our country at least,) is almost ruined. It is true, you may rob your own land, but, should your garden be in the city, (as mine is situated,) you would search many an hour before the proper pasture soil could be obtained. Knowing these difficulties in providing suitable soil from a pasture, I, in the first place, gave the directions for the compost, with the animal carcasses; and then, in giving the substitute, presumed that it would be understood, that I did not consider that it was imperatively necessary that these materials, flesh and all, should be incorporated into the border. That it is best to do so, I firmly believe.

My first border was made in 1834, on a flooring of stones; it was very rich; much slaughter-house manure, with many bones, were incorporated with the soil; cow manure, and some lime, also, was added nearer the surface. This house has always had artificial heat applied to it; and, for the last ten years, has been forced in December, and has never failed to produce a crop of fruit. This season of 1848, the fruit was as fine as it ever has been; the bunches, many of them, weighing

one and two pounds each; the berries were large, and well colored. The second border was made a few years after the first; the manures used were similar to the above; but, instead of stones, the bottom of the border was paved with bones, and well covered with them; the vines have always done well, and ripened good crops of fine fruit. The third border was paved, at the bottom, with stones, as whole bones could not be obtained. The manures, in this border, were entirely from the barn-yard, from horses and oxen; it was very coarse, having much litter and old (Indian) cornstalks in it; the soil was the garden loam, which had been freely manured with barn-yard material; the proportion of manure added was one half, certainly, and perhaps rather more. In this border, the vines have made the most rapid growth of any that I have planted: but the fruit produced therein, although very fair and well-colored, is not large, the berries measuring two and a half to three and a half inches round, for Hamburgs; while, in the houses, where bones and slaughter-house manures, or the carcasses of animals are added to the compost, the berries measure from three to four inches in circumference.

By far the largest part of my borders were made, since the above, in 1843. Slaughter-house manures, bones, the carcasses of animals, old mortar and bricks, oyster-shells, horse and cow manure, old leather and loam, were added in considerable quantities. I have not discovered any reason for wishing to change the compost. At the end of the house, in a space used for the furnace, no manure was added on the outside, as the street of the city was here. The soil was a good yellow loam, and, on the street,

covered with gravel. To notice the difference in the fruiting and growing of the vines, when situated in this unprepared soil, as compared with the compost above, I planted four vines, so situated that three of them would send their roots into the street in search of food. The difference has been surprising. The vines planted in the border have ripened three good crops of fruit; those in the natural soil have not ripened a bunch, and, until this year, have not even set a berry. One vine, a Hamburgh, has, at present, a very small bunch upon it. The vines have been pruned and well cared for, and I have no reason to suppose that they will not eventually yield a crop of fair fruit; that they will be able to bear comparison with the other grapes, in the same house, I do not expect.

In 1844, having occasion to make more border, and having a large quantity of stable manure and old leaves, which had been used for covering the roots of the vines in winter, I thought this, if added to the soil in large quantities, which was also a good loam, with some small quantity of cow manure and bones, would insure me a sufficiently good compost. But it was a mistake; the vines grew slowly, and not more than half of them fruited the last season. This spring, I have enlarged the border very much, and added strong manure, with many whole bones and twenty bushels of ground ones, with one hundred bushels of charcoal screenings, and as much more old mortar and brickbats, with some considerable wood-ashes mixed with them. The vines are now growing very well, and many, but not all of them, have good crops of fruit upon them. The fruit in this house was small and well colored. In the autumn, watering

with liquid manure was resorted to with good effect, yet the difference was very much in favor of the border with the carcasses. More trials with like results, might be added; however, if these have been properly stated,—and I am certain that my object has been to obtain facts, not to establish theories,—and that these trials have resulted as above expressed, then there can be no necessity for further testimony of mine, as it all tends the same way, and the mere repetition of the trials would be useless. The question now is, whether the experiments have been fairly made. I think they have; that climate and other circumstances of soil and situation will vary, in some degree, the results of similar trials in other localities is very probable.

*The effect of different manures in promoting the growth of the roots of the vine.*—This summer, I placed small glass bottles, filled with rainwater, under the stems of grape vines, that had roots about one and a half inches long on them; they reached the water, touching it sufficiently to encourage the growth in the root; the bottles were then secured in this position. In seven days, the roots had pushed strongly into the water. I then added different manures, as liquids, to the water, in a very diluted state; the object being to have the roots of the vine open to view, that the effect of the different manures in producing rootlets or spongioles could be observed.

No. 1, had a grain of guano, in the powder, added; the effect of this was, that, in forty-eight hours, the rootlets began to put out from the sides of the root, and to consume the liquid. I then took a small teaspoonful of the guano and mixed it with half a gill of water, and, as



the liquid was consumed by the roots in the bottle, it was filled up with this. After a few applications of the guano, the rootlets, which at first put forth and grew freely, ceased to grow, or to consume the liquid : they soon died, and, on removing the bottle, I found them in a putrid state. This experiment, though unsuccessful, was satisfactory, as it confirmed the opinion I had formed of this manure, that, when applied in a highly diluted form, it is valuable, and that one cannot well be too cautious in using it.

The second experiment was simple rainwater ; the root in this grew very slowly, and in five or six weeks made only three or four inches, with four rootlets, about one inch long, each ; they continued to grow until removed.

No. 3, was manured with the liquid from a teaspoonful of ashes from the wood of the grape, soaked in half a gill of rainwater ; the effect was sudden and great ; and the roots formed so fast, that, in three weeks, there were thousands of feeders in the bottle, and, in bright days it had to be filled morning and evening ; it very soon used up the first quantity, and had another supply furnished ; this I cut off and planted out ; it is now a growing plant in the border.

No. 4, was manured with the extract from one pound of cow manure, which had been under cover four years, and never exposed to the weather ; it was as free from any offensive smell as the purest spring-water, and was prepared by steeping several days, before using, and was then strained into a bottle. The effect of this was like the above,—from the ashes : I could not perceive any difference. This is also a plant now growing in the border.

No. 5, was the extract of meadow muck, which had been under cover several years; one pound of the soil, to which was added a very little pot-ash, was steeped in water several days, and strained off into a bottle, and applied as the roots consumed the liquid. This afforded a suitable food, and the spongioles continued to grow and increase rapidly for three weeks, when they received a check, and ceased growing, and were changing color; the bottle was removed, and the roots placed carefully into one filled with simple rainwater again; this saved them, and they again began growing. The liquid, which had before proved too powerful, was now supplied them; as they consumed the water in the bottle, they grew as rapidly as before the check, and formed a fine, strong-rooted vine, which is now in the border.

No. 6, was manured with the liquid drainings from the hog-pen; although very much diluted, the first application destroyed the young roots. In renewing the trial, the liquid which had caused this, was used as the same manure, still further diluted, and the effect was good; the bottle was filled with roots.

No. 7, was manured with the extract of the leaves and young shoots, trimmings of the grape vine; these were steeped a few days, and kept warm; when applied to the water in the bottles, it was quite acid. This destroyed life very soon, the acid being too powerful. On repeating the experiment, and after applying the same liquid, when the acidity had passed away, the roots made with vigor and rapidity; this formed a plant, now flourishing in the soil.

No. 8, was another trial with guano, in a more diluted

form ; it did not induce the forming of roots, as did some of the others. The reason of this, undoubtedly, was the powerful nature of this substance, which, in the exposed circumstances of the roots, was, in all the trials, too strong.

The cow manure and ashes had the most beneficial effect ; that is, they caused the bottles to be filled, in the least time, with roots and rootlets innumerable : although the strength of the liquid was constantly increasing, there did not appear to be any injurious effect therefrom.

## LIST OF VARIETIES OF GRAPES.

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THE following list is recommended for planting in the retarding house, and in the proportions named. If the number of vines to be planted is greater or less than these, you can increase or decrease them by varieties that ripen late, or those of the list given in greater numbers :—

Black Hamburgh, six vines, including with this variety Wilmot's new Black Hamburgh, Victoria Black Hamburgh, and the No. 16 Black Hamburgh.

Muscat of Alexandria, two vines.

Zinfindal, one vine.

Black Lombardy or West's St. Peter's, five vines.

Wortley Hall seedling, three vines.

Portien Noir, three vines.

Tottenham Park Muscat, one vine.

Syrian, three vines.

Black Damascus, one vine.

Black Prince, one vine.

Old Black St. Peter's, one vine.

Cannon Hall Muscat, one vine.

White Hamburgh, one vine.

Escholata Muscat, one vine.

White Nice, one vine.

Red Lombardy, one vine.

Queen of Nice, one vine.

Bowker, one vine.

Bishop, one vine.

Black Portugal or Ferrar, one vine.

Prince Albert, three vines.

#### VARIETIES MOST VALUABLE FOR GENERAL PLANTING.

For planting, I would recommend the different varieties of the Black Hamburgh grape as the best for the greatest number of vines.

The Grizzly, the White and the Black Frontignan are all admired by those persons who like the Muscat flavor; they are liable to shrivel, and are more delicate than other grapes, and do not keep well when ripe; the Grizzly is the earliest of them.

The Muscat of Alexandria is a large oval grape; it does not set well under glass, and requires artificial impregnation;\* it is a firm-fleshed or breaking grape, and when well ripened, cannot be exceeded in richness.

The Tottenham Park Muscat is very like the above, but not so high flavored, it sets the berries better.

Portuguese Muscat is like the above, but is more highly musk flavored.

Chasselas de Bar Sur Aube is a fine white grape, and a good bearer.

Pitmaston White Cluster has rather small berries, but is very early and good.

\* Otis Johnson, Esq., of Lynn, a successful cultivator of the grape, the past year, allowed the shoots of this variety to grow at random until the fruit was swelling, and he thinks the result of the experiment was favorable: the fruit set remarkably well.

Syrian, white, has very large bunches, sometimes weighing twenty pounds.

The descriptive list of grapes annexed will enable any one to select such sorts as his taste may dictate.

For a cold house, I would recommend the following, and in proportion to the number named to each sort. The most desirable are the first named :—

Black Hamburgh, ten vines.

Wilmot's new Black Hamburgh, ten vines.

Wilmot's No. 16, ten vines. This may prove no better than the old variety.

Victoria Hamburgh, ten vines.

White Frontignan, two vines.

Grizzly Frontignan, two vines.

Pitmaston White Cluster, one vine.

Golden Chasselas, two vines.

Chasselas de Bar Sur Aube, one vine.

Rose Chasselas, one vine.

Red Chasselas, one vine.

White Gascoigne, one vine.

Royal Muscadine, one vine.

Red Traminer, one vine.

White Rissling, one vine.

Macready's Early White.

The last seven are equally valuable, and there are many others as much so, as may be seen by referring to the varieties.

For a forcing-house :—

The Black Hamburgs, in variety.

The Red, and the Rose Chasselas.

Chasselas de Bar Sur Aube.



White Frontignan.  
Black Frontignan.  
Grizzly Frontignan.  
Pitmaston White Cluster.  
Golden Chasselas.  
White Gascoigne.  
Royal Muscadine.  
Muscat of Alexandria.  
Tottenham Park.  
Zinfindal.  
Cannon Hall Muscat.  
Red Traminer.  
Macready's Early White.

The Early Black July may be added, if it is desired to get early grapes; this is a small grape, of a pleasant flavor, but no earlier than the Pitmaston, and only desirable for its color. They will both, if planted in the warmest situation, come on together, and much before the Black Hamburgh. The Grizzly Frontignan and Golden Chasselas are both very early.

These lists embrace a good number of the best varieties; there are several new kinds well spoken of, but which have not been sufficiently tried, in this country, to prove their qualities. The Chasselas Musqué cracks very much, thus far, and, if it should habitually do so, will not be worth cultivation. The Muscat Blanc Hatif (Early White Muscat,) is particularly recommended abroad; but this has proved to be the same as the Chasselas Musqué.

There are five or six more kinds which will be fully proved in two or three years, but it is hardly probable

there will be any thing better produced, for cultivation under glass, than the best of the old kinds named above. For large collections, almost any number of kinds may be added. The Garden of the Luxembourg, at Paris, numbers about five hundred varieties, many of them worthless, and a great number only differing very little in foliage, or in the time of ripening.

*Luxembourg Gardens, Paris.*—"Grape vines occupy a prominent part in this horticultural school, the kinds being very numerous, and the plants taking up a considerable proportion of the ground. Here are now assembled all the varieties of vine known to be cultivated in France, or, I may say, in Europe. To the best of my recollection, nearly three hundred varieties are named, and as many more without names, which are regarded by M. Bosc as possessing characters sufficiently marked to entitle them to rank as distinct.\* In general, there is only one plant of each variety; but the Chasselas de Fontainebleau is an exception, there being a long row of this on one side of the garden. It is the favorite variety, and has been justly styled the 'raisin de table par excellence,' of the French. At Fontainebleau, the vines grow on a light sandy soil, and the grapes are sweeter than those produced on a heavy soil.

The varieties of table grapes are few in number, perhaps scarcely exceeding twenty; the great mass of kinds consisting of sorts cultivated in the vignobles, in the various departments of France, in Italy, Spain, and Germany. Many of these approach in character very near

\* Under Napoleon, Chaptal collected in this garden fourteen hundred varieties.

to each other; and it frequently happens, as with our orchard fruits, that the same kind is known under different names in different districts."—*Horticultural Tour, Edinburgh*.

The following list\* contains the new varieties, with the valuable older ones recently brought to notice, part of which have not yet been proved in this country:—

¶ *Black Hamburgh*.—The bunches are large and shouldered, the berries black and roundish; it is unnecessary to say more, as it is universally known to be the best variety for general cultivation under glass.

¶ *Eschoiata Muscat*.—This is a seedling of the Muscat of Alexandria. This variety, which Mr. Thompson makes a synonyme of the Muscat of Alexandria, was shown at the exhibition of the London Horticultural Society, September, 1847. Although distinct, it is said to resemble that variety; the berries have a pink tinge. The Esperione is supposed to have been one of its parents. This grape was brought into notice by Mr. Money. It keeps well.

¶ *Chasselas Musqué White*.—Cracks badly; but, when grown in a part of the grapery where there is a free circulation of air, it does well in usual seasons. At Enghien, seat of the Duc d'Arenberg, "we found the Chasselas Musqué trained along the front of the house possessed by the chamberlain, and we were told that, before the end of October, the grapes seldom fail to ripen fully, and to acquire their musky flavor."—*Hort. Tour, Edinburgh*, 1823.

\* The grapes marked with a ¶, have been proved in this country to be true to the description.

¶ *Cannon Hall Muscat*.—Sets badly;\* requires artificial impregnation; the berries are white, large and very handsome, and high flavored. A late variety.

¶ *Bloom Raisin Seedling*.—A coarse late white variety; sets badly.

¶ *Wilmot's New Black Hamburgh*.—Has large, round, very black berries, with a hammered appearance. It is uncertain in quality, often fine, but as often too astringent; it requires always to hang long after it has colored, before cutting; in a poor situation it does not set well.

¶ *Wilmot's No. 16*.—Has proved fine; it is a variety of the Black Hamburgh, and often cannot be distinguished from it.

*Blussard Noir*.

¶ *Chasselas Hatif Petit*.—Too small to be worthy of cultivation.

¶ *White Hamburgh*.—A very handsome grape, with large bunches; the berries are oval; it is of second quality.

¶ *Pitmaston White Cluster*.—A very fine early variety; the bunch is of a medium size, the berries are round and compact; this is a desirable variety. The Scotch White Cluster is the same as this, or very much like it.

¶ *Black Lombardy*.—A fine late grape; this is the same as West's St. Peter's; esteemed by those who prefer a sprightly flavor mingled with the sweet.

\* When a vine in the spring has fruit clusters in large numbers on the young shoots, it is said to "show fruit well." A vine may do this and yet be an unproductive variety,—as in the blossom, some kinds, under unfavorable circumstances, do not set their fruit; that is, the seed is not impregnated, and, when this is the case, the berry remains small.

¶ *Victoria Hamburg.*—This is said to be a synonyme of the old kind; but there have been specimens exhibited which certainly appeared different. This variety is now reported as exhibited in England, and there is no doubt that it is an improved variety of the old Hamburg.

¶ *Muscat of Lunel.*—This is a variety of the Muscat of Alexandria, grown in a district of France, and with smaller berries.

¶ *Tokay, Charlsworth.*—Excellent, with a Muscat flavor. The Gardeners' Chronicle for 1847, page 624, says, perhaps it is not different from the White Muscat of Alexandria. The grape which I received under this name from England is more like the White Frontignan, but one month later than that kind.

¶ *Wortley Hall Seedling.*—A good, and very late grape, with oval black berries; subject to crack, in some seasons.

¶ *Red Traminer.*—Good, with small round berries; has twenty synonymes. A much esteemed wine grape on the river Maine.

¶ *Rissling White.*—Ripens in the open air; the berries are small, and the flavor good. This is much esteemed as a wine grape near the Rhine; it has twenty-two synonymes.

¶ *Black Tripoli.*—Has round berries, not unlike the Black Hamburg.

¶ *Black Prolific.*—Has round berries, with large bunches. It is good, but does not keep well, and ripens unequally.

¶ *Palestine Grape* —The bunches of this variety are

enormous, and the berries are oval, small, and white; the shoulders, or stems, are very long, and the berries are in clusters, at long intervals; by no means a valuable grape.

*Suabi.*

*Liverden.*

*Fromental.*

¶ *Florentine.*—Very like Black July.

*Falanchina.*

¶ *August Muscat.*—A seedling raised by M. Vibert, of Angers, in France, from the grape called there the Frankantal, (*supposed to be what we call the Black Hamburgh, as it usually proves so, when ordered from France*;) it is a very weak growing vine; the fruit is black, of Muscat flavor, and is said to mature its fruit earlier than any other grape; a vine in my grapery has fruited the past summer, and the fruit was small and poor. It is undoubtedly the earliest grape grown, and will ripen its fruit, when highly forced, in three months.

¶ *Malvasia, Early White.*—This is very like the Pit-maston.

¶ *Golden Chasselas.*—Has a very large round berry, with a large bunch, and is very handsome; sets poorly and cracks; ripens early, before the other Chasselas kinds. This grape varies more than any other sort in its ripening. Vines, raised from the same plant, grown by myself, and never out of my premises, and equally well situated in a cold grapery, differ twenty days in the time of ripening their fruit this season of 1848.

*Aleppc.*—The bunches are large; it is a good bearer,



and a good grape ; the berries often equally divided, one half being black, and the other half white. Thompson gives eight synonymes, and Prince nine of this.

¶ *White Nice*.—Has very large bunches, with small berries. The quality is good. The bunches are very like the Royal Muscadine.

¶ *Esperione*.—The berries are small and black, and the bunches very large, of third quality.

¶ *Red Chasselas*.—This is a good bearer with a fine flavor ; the berries are as large as those of the Bar Sur Aube. This may be distinguished from the Rose, or Violet Chasselas, from the singularity of the berries, which are colored from their first formation ; at maturity, it is sometimes highly colored, but, not unfrequently, is of a pale red ; the young shoots are bright red.

¶ *Grosse Noir of Lorraine*.—A vine sent me as this, has proved very like Black July.

¶ *Decon's Superb*.—A white grape with oval berries, very handsome, but ripens badly ; half the fruit is often sour and worthless.

¶ *Prince Albert*.—This variety will fruit this season in this country. “*Royal Albert* grape forms a large, rather loosely shouldered bunch, with black, somewhat oval berries, and is later than the Black Hamburgh. It requires to be compared with the large Black Ferrar, for probably, it may be found not different.”—*Gardeners' Chronicle*, 1846, page 344. It is distinct from the variety grown by this name here.

¶ *Queen of Nice*.—This is a handsome fruit, with large bunches and berries, but it is said to be a small bearer ; the berries are white, or greenish, and tinged

with a red or rose color, and, when exposed to the sun, more highly colored. This proves a shy bearer in the forcing house, but has done well in the retarding.

¶ *Violet Muscat*.—A grape by this name, fruited by me, has oval berries, but no Muscat flavor, and a poor bearer.

¶ *Grosse Perle Blanche*.—Sets badly, and has no particular value, with oval white berries.

¶ *Xeres*.—This has proved to be the same as White Nice.

¶ *Black Morse*.—Is like Black Hamburg.

¶ *Purple Muscat*.—Has not the flavor of the Muscat, and is a poor bearer; sets badly.

¶ *Austrian Muscat*.—Is not unlike the Grizzly; in flavor and color, it promises to be fine; the berry, when growing, is oval, and changes to round, or nearly so, at maturity.

¶ *S. Charges Henling*.—A black variety; the berries are very small, of good flavor, and remain sound for a long time after maturity.

¶ *Portien Noir*.—A large roundish, black grape; remarkably handsome, of peculiar flavor, and very late.

¶ *Gros Coulard*.—Has large white grapes and is early, ripened its fruit in my grapery in 1852.

¶ *Bishop*.—Is very like the Portien Noir.

*St. Peter's of Aliers*.—The berries are large and oval.

¶ *Caillabee*.—A white sweet water, of no value for grapery.

*Partridge Foot*.

¶ *Garden Tokay*.—Red, with small, but very sweet and rich sweet water flavored berries.

¶ *Hansteretto*.—Black; does not set well; this has oval berries. Not worth cultivation.

*Black Muscat of Alexandria*.

*Red Chasselas of Vibert*.—This is supposed to be a hybrid of the Isabella and Chasselas.

¶ *Chaptal*.—This is another seedling of M. Vibert, with large, white, oval berries. Sets very badly, and worthless for forcing.

*Madelaine of Vibert*.—Has berries of medium size and oval.

*Grosse Perle Blanche de Semis*.—Seedling of Vibert; said to have very large bunches, and the berries uncommonly large and nearly round. Two other varieties, from seed, by M. Vibert, with black-colored fruit, which he calls Nos. 3 and 4, are early; but, as he does not mention them as particularly good, it may be presumed that their quality is not remarkable.

¶ *Lombardy Red*.—This is a late grape, with very large bunches, and is the same as the flame-colored Tokay.

¶ *Zinfindal*.—The bunches are large, often with two shoulders on the same side nearly as large as the main bunch; the berries are medium size, round, and very black, with a thick bloom; requires to hang several weeks after coloring before it is ripe. I cannot find this grape described in any book. Prince, in his treatise, mentions, as a new grape from Hungary, one named Zinfardel; this may be the same.

¶ *Black Damascus*.—The berries are large, oval, and

of a black color; does not set well, otherwise it would be a most valuable kind.

¶ *Dutch Sweetwater*.—The berries are large, round, and of a white color; when exposed to the sun, of a russet tinge; it is a pleasant grape.\*

¶ *White Tokay*.—The berries incline to an oval figure; in flavor, like the Chasselas. The underside of the leaf has a fine down. Not so early as the Chasselas; shrivels badly.

¶ *Raisin de Calabre*.—A white grape of a musk flavor, valuable for hanging late.

¶ *Black Morocco*.—The bunches are large, and dark red or black; the berries are oval; it is of second quality, sets badly.

¶ *Muscat of Alexandria*.—The bunches are large, and the berries are loose, oval, and when perfectly ripe, of an amber color; the flesh is crisp, and highly flavored; it does not set well, and requires artificial impregnation. A late variety.

¶ *Tottenham Park Muscat, White*.—Is like the above, but sets its fruit better. Not so highly musk flavored.

¶ *Sweetwater, White*.—The bunch is open, the berries are round, the skin is thin; this is a good grape, but does not always set well.

¶ *Syrian, White*.—The bunches are very large, sometimes weighing twenty pounds. The berries are oval, and the flesh firm, and, when allowed to hang until of an amber color, very good. It requires a long time, with much heat, to perfect its fruit.

\* A grape, under the name of the "New Dutch Sweetwater," was exhibited at the Horticultural Society's Room, London, April 20th, 1847.

¶ *Verdelho*.—This is a small, oval, white grape, of the finest quality. The vine is a very strong grower, and bears great crops. It is a favorite variety for the table, as well as for wine in Madeira and the Azores. It is a later grape than the Black Hamburg.

*Blanche*.—Is an early sort, with greenish white, and oval berries, thin skinned and sweet.

¶ *White Gascoigne*.—A fine white grape; the bunches are quite large and compact, with shoulders; the berries are inclining to oval, are subject to crack in moist weather, and do not keep well after fully ripe.

*Bordelais* or *Bourdels*.—A very delicate grape that requires a high temperature, and a long season to bring it to maturity; the berries are oblong, and the bunches are very large.

¶ *Muscat Blanc Hatif*.—A grape by this name, lately received as a new kind from France, has proved the Chasselas Musqué.

*Black Tokay*.—A wine grape.

*Alexandrian Ciotat*.—The bunches are large; the berries are white, of an oval form, with a thin skin. This is a sweet grape, but sets badly; do not think it worthy a place in a grapery, but it may prove valuable, for open culture, in the southern States.

¶ *Black Cluster*.—The bunches and berries are small; the latter vary in shape,—oval and round are usually found in the same bunch; they grow very close together, (as is the case with all cluster grapes,) and often, by their own pressure, burst the skin, causing rot, which soon spreads through the whole bunch.

¶ *Black July*.—Very much like the Black Cluster. An early variety.

¶ *Miller's Burgundy*.—The fruit is like the two preceding, but it is distinguishable from the above by the white down on its leaves, from the mealy appearance of which it has derived its name. Of the three preceding varieties, Mr. Thompson gives eighty-four synonymes, and adds two varieties as distinct: the Scarlet-leaved Black Cluster, a wine grape of poor quality, and the Black Cluster, nice, which he represents as loose growing. These three, the Black Cluster, the Black July, and Miller's Burgundy, so far as the fruit is concerned, may be considered the same; they color early and rapidly, and, when perfectly black, are as sour as any one could wish; by hanging four or five weeks, they become very good; but they are so small, and require so much thinning, and usually having five large seeds, that they can hardly be deemed worthy a place in the grapery.

¶ *Black Prince*.—The bunches are long, and often shouldered; the berries are oval, of a good size, and color well; this is a good grape; it sometimes cracks; the skin is thick, and, in this respect, is inferior to the Black St. Peter's. It sometimes keeps well on the vine; at other seasons it rots badly.

¶ *Black St. Peter's*.—The bunches are large, long, and sometimes shouldered; the berries color well, and have a thin skin; this grape also sometimes cracks. It hangs well after it is ripe, and is, on this account, one of the most valuable grown in the grapery. I find the keeping qualities of this grape uncertain; it some years decays suddenly after it is fully ripe.



¶ *White Bual*.—The bunch is compact; the berries obovate, white, and thick skinned; late and good.

¶ *Knight's Variegated Chasselas*.—This is said to resemble the Aleppo; the bunches are loose, and the berries are round and sweet, with a thin skin; it is of second quality.

¶ *Chasselas, Rose or Violet*.—This is a good grape; in the appearance of the bunch, and in every other respect but color, resembling the Chasselas of Fontainebleau; when ripe, it is of a rich red, or rose color.

¶ *Chasselas de Bar Sur Aube*.—This grape has very large long bunches; the berries are round, of medium size, and, when fully ripe, of an amber color. When pruned upon the long-cane system, I have had bunches measuring fourteen inches in length; it seldom shoulders.

¶ *Chasselas of Fontainebleau* and the *White Chasselas*, appear to be alike in every particular. They differ from the above in the shape of the bunch, which is often shouldered.

¶ *Royal Muscadine*.—This grape, in respect to the size, color, and flavor of the fruit, or berry, corresponds exactly with the Chasselas de Bar Sur Aube, Chasselas of Fontainebleau, and with the Early White Muscadine of the French, yet, in the size of the bunch, it is quite distinct; the Royal Muscadine growing to a very large size, and having large shoulders, the bunches often weighing four, five, and six pounds.

¶ *Early White Muscadine*.—This is a variety of the Chasselas, and in no way distinguishable from the White, or Chasselas of Fontainebleau, except in the time of ripening, which may be ten days earlier. I have culti-

vated several other varieties of French grapes, sent over as distinct, but cannot discover any difference in them from the above; all the White Chasselas grapes, when perfectly matured, change to a golden, or amber hue, if grown in a situation fully exposed to the sun. Mr. Thompson gives twelve synonymes of this grape, and classes the Chasselas of Fontainebleau and White Chasselas with them. But there is no question that the grapes, cultivated in this country under the names of Royal Muscadine and Chasselas de Fontainebleau, are quite distinct.

¶ *Josling's St. Alban's*.—Has proved to be Chasselas Musqué.

*Sahibee*.—An East Indian variety, introduced to the Horticultural Society's Garden, Turnham Green, by Col. Sykes. It is stated to be an abundant bearer. The bunches are said to be large, shouldered like the Black Hamburgh, and quite as handsome; the berries are oval, about the size of the Muscats, without that flavor, and have a fine rosy tinge on the side next the sun.—*Gardeners' Chronicle*, 1847, page 511. The color of this grape corresponds somewhat with that of the grape described as Queen of Nice.

¶ *Bowker*.—This is a grape raised in the garden of Joel Bowker, Esq., of Salem, Massachusetts, from the seed of the Bloom Raisin, imported from Malaga. It is a great bearer, the fruit handsome, the bunch large, closely set, berries roundish, inclining to oval, white, and of a pleasant flavor, without any musk. It is quite as handsome as the White Hamburgh, and a better fruit; it succeeds best in a poor soil.

*Corinth, Black.*—This is a small round grape, of second quality, from which is made the black currant of commerce.

*Corinth, White.*—This is also small; the color is white; from this grape is made the Sultana, or Seedless raisin. According to Mr. Thompson, there are fifteen synonymes of this.

*Cornichon Blanc.*—A grape of second quality; it is said to keep well; the skin is thick, the flavor sweet, and the bunch large and loose; form of the berries elliptical. Mr. Thompson gives fourteen synonymes of this variety, and Mr. Prince, five.

¶ *De Candolle.*—This grape has a round berry, and is of a reddish color. It is valuable as a table fruit; it ripened in my grapery in 1848, and has very large bunches.

¶ *Ferrar, Black.*—This grape was received from Portugal. The bunches are quite large; the berries are oval, compact, and very black, of medium size; the flavor is peculiar, not unlike that of the cherry; the flesh is breaking, or crisp; it is not generally esteemed, but very much liked by some. It is a very handsome variety.

¶ *Black Frontignan.*—This is a fine early grape, of Muscat flavor; the bunch is long, the berry is round and black, and of medium size. Mr. Thompson gives thirteen synonymes of it.

*Blue Frontignan.*—This is a good grape of a slightly Muscat flavor; the berries are roundish, and not so large as the Grizzly, or White Frontignan. The Violet Frontignan and Black Constantia are synonymes of this.

¶ *Grizzly Frontignan.*—The bunches are of a good

size; the berries are round and colored, as the name designates; it ripens early, and is one of the richest Muscat-flavored grapes. According to Mr. Thompson, there are thirteen synonymes to this.

¶ *White Frontignan*.—This variety has bunches often quite large; the berries are round, and, when fully ripened in an exposure to the sun, are of an amber color. The Black, White, and the Grizzly are, in flavor, very much alike, when grown under the most favorable circumstances, so far as respects quality; but, for a variety in color, it is desirable to have the three; the Grizzly is the earliest of them. The synonymes are twenty-two in number.

*Gros Rouge de Provence*.—The bunches are loose; the berries roundish and black, and of second quality.

*Petersburgh*.—A black grape, with loose bunches; the berries are round, the skin thick, and the flavor sweet.

¶ *Lechmere's Seedling*.—Has proved the same as Macready's Early White.

*Grosse Guillaume*.

*Longford's Incomparable*.

*Schiras*.—This is said to be a very fine grape lately received from Persia.

¶ *Poonah*.—This is a large, late black grape, very handsome, and of second quality.

¶ *Morinet*.—A grape recently received from France. It has a long, loose bunch, with oval, white berries; fruited, in 1848, in the collection of Messrs. Hovey & Co.

¶ *Macready's Early White*.—This is a new variety; it has been fruited the past few years. It is a white

grape, with an oval and rather small berry. I do not consider it any better than the Pitmaston.

¶ *Portuguese Muscat*.—A variety of the Muscat of Alexandria; it is more musque-flavored, and sets its fruit better.

¶ *De Rhineland*.—This is a white grape, and said to be hardy; under glass, it has proved not unlike White Chasselas.

¶ *Cambridge Botanic Garden Grape*.—This fruit is black, and esteemed by many as quite equal to the Black Hamburgh; it has been fruited in this country by R. L. Colt, Esq., of Paterson, N.J.

*Barbarossa*.—This is a new black grape, advertised for sale in England. It is represented as having berries as large as the Hamburgh.

¶ *Gross Bleu*.—A new grape, very like the Black Hamburgh. Messrs. Hovey, who have fruited it, state the foliage to be quite different, however.

¶ *Gross Gromier du Cantal*.—Parsons & Co., of Flushing, near New York, have fruited this variety. They represent it as of second quality, but a great bearer; color, foxy purple; berries a little larger than the Red Chasselas. From the first description of this new grape in Europe, I have been of opinion, that it would prove a synonyme of De Candolle, or Flame Colored Tokay.

¶ *Chasselas de Florence*.—This new grape was proved in Hartford, Conn., last season, (1852,) in the grapery of Charles L. Porter, Esq. This gentleman says, "It is a fine Chasselas, equal, perhaps, to the Bar Sur Aube, and of the same character."

¶ *Muscat Fleur d'Orange*.—This grape came from the French gardeners, who spoke of it as the best of all Muscats. So far as the first year's trial is any evidence, it is hardly worth cultivation. The berries are oval, with a little musky flavor; skin less thick than the Muscat of Alexandria, color the same. It cracks a good deal, and seems to partake of the character of the Musqué Chasselas. This fruited in 1852, in the collection of Mr. Porter, who furnished me with the above descriptions.

*Bronze Grape*.—This name is given to a fruit seen and eaten in Syria by J. V. C. Smith, M.D., of Boston, who saved the seed and brought them to this country, presenting them to the Massachusetts Horticultural Society for distribution. I raised several vines from the seed coming to me. Having compared the foliage with the Syrian, Muscat of Alexandria, and Queen of Nice, kinds which I thought it most probable to be, find it quite unlike either of them, and the chances are in favor of obtaining a new and valuable variety.

¶ *Musqué Verdel*.—This is a seedling of my own, a cross, naturally, of Verdelho and Grizzly Frontignan, and partakes of the marked peculiarities of these grapes, being musque-flavored, and having the thin, rich pulp of the Verdelho. Thus far, the berry has been rather small, under size, but as it yearly improves, hope it may prove valuable.

*Seedlings*.—I have many seedlings not named, that have fruited the past years of 1850, to 1852, inclusive. They resemble the White Chasselas and Black Hamburg, generally; one, from seed of Wilnot's Black



Hamburgh, is very handsome, but more sour than the original. Mr. Amos W. Stetson, of East Braintree, Mass., has many seedlings from the foreign varieties coming into fruit. This gentleman exhibited a bunch last season from seed of the Grizzly Frontignan, no doubt crossed with the Black Hamburgh. It ripened early; was very black, medium sized, and of rich, sprightly musque flavor. Several other persons have seedling vines coming into bearing, and a few years will show if we have anything to hope from these efforts of hybridizing. These same gentlemen have, many of them, Hybrid Grapes in bearing, or coming into fruit this summer of 1853, of crosses between the *Vitis Vinifera*, or European sorts, and the *Vitis Labrusca*, or American species. Judging from the variety of wood and foliage of these new grapes, it does seem, that the prospect is very good, that we shall soon have native hardy grapes that will ripen in open culture. Some of these will be described in the list of American species.

*VITIS LABRUSCA*.—There are several American species of the grape, according to Prince; and the same author gives over one hundred varieties of this species. For general cultivation, the first two on the list are the most valuable ones.

*Isabella*.—This is a native of South Carolina. Mr. Prince, in his Treatise on the Vine, says that this grape is named in honor of Mrs. Isabella Gibbs, who introduced it into cultivation in New York. The berries are black and oval; the bunches are of a medium size; it has a foxy flavor.

*Catawba*.—This grape is said, by Mr. Adlum, to be a native of Maryland. It is one of the hardiest and most productive of the American varieties. The berries are red, or purple, inclining to black. These two varieties are now so extensively cultivated, and their good qualities as table fruit and for wine are so well established, that it is unnecessary to say more of them. It also has the foxy flavor, and requires a longer season than the Isabella.

*Bland*.—This is one of the best native grapes. It has less of the foxy flavor than the Isabella and Catawba; it is not a great bearer, and will not ripen in Massachusetts.

*Diana*.—A seedling raised in Massachusetts from the Catawba. It resembles its parent, and is ten days earlier, and will ripen in seasons when the Isabella and Catawba, similarly situated, will not; a strong recommendation in its favor.

*Elsingburgh*.—A good flavored, very small grape. This is valued by many for the table; it is free from the foxy flavor.

*Lenoir*.—A very excellent table grape; perhaps superior to any of those described. It is believed to be a seedling of the Burgundy grape. It has very much the habit of a foreign vine. The bunches are very handsome, large, compact, and not much shouldered."—*Downing's Fruits and Fruit Trees of America*. This grape is not known much in Massachusetts.

*Norton's Virginia*.—*Vitis Nortoni*, Prince, (small. A native of Richmond, Virginia; said to be a cross between the Bland and Miller's Burgundy; it was raised by Dr. N. Norton. Mr. Downing says it is very productive in the garden, or vineyard, especially at the south,

where many kinds rot. In Massachusetts, it is a small bearer compared with the Isabella; this may be owing to the wood of the vine not ripening perfectly, in consequence of the shortness of the season.

*Ohio*.—This grape has been introduced into cultivation by N. Longworth, Esq., of Cincinnati. The bunches are large and long, the berries small, round, and black, the flesh tender, juicy and sweet.

*Scuppernong*.—Is a distinct species found growing wild from Virginia to Florida; there are two kinds, the black and white. The bunches are small, usually of five or six berries, which are large and round. It is quite tender, and will not live at the north. See description of this in North Carolina vineyard account, and in Florida vineyard culture. The Honorable A. G. Semmes, of Quincy, Florida, says this grape is a native of Greece, and is known there as the *Alaric*, and that the richest wines are made from it.

*Missouri*.—*Vitis Missouriensis*, Prince. A grape used for making wine in Ohio.

*Herbemont's Madeira*.—Used also for making wine.

*Alexander's*.—A wine grape, native of Pennsylvania.

*Sage*.—This grape was found by Mr. Henry E. Sage, of Portland, Connecticut, growing wild on the margin of a small stream, and was removed by him to his garden, as early as 1811. It is represented to be near a lilac color. From Mr. William Leonard, of the Shaker Society, I received two vines, and an account of the fruit and of the well-established reputation which it has in the vicinity where it was found. Mr. Leonard made a visit to the place, and saw the plant in fruit; he measured some

berries, which he found four inches in circumference. At the nurseries of the Shaker Society, Harvard, vines of this grape may be found on sale, and, probably, at the farm of Mr. Sage, Portland, Connecticut. The foliage blighted badly in my garden in July, 1848. In the autumn of 1852, Mr. Sage sent me a quantity of the fruit of this vine. It is the best Fox Grape I have ever eaten, and, when fully ripe, has but little pulp. It will be esteemed by those fond of the peculiar flavor of our native grapes, and disliked by others of opposing tastes.\*

\* The following are extracts from two letters of Mr. Sage to Mr. Leonard, giving its history, etc.:—

"*Portland, Oct. 1st, 1846.*—The vine was taken from the margin of a small stream, in quite a secluded spot, some thirty-five years since, and has been a constant bearer many seasons, yielding in great profusion.

"Perhaps I shall be considered selfish, but must say they are the richest flavored grapes I have ever tasted. The pulp is very soft and juicy. They commenced ripening about two weeks since, and are now dead ripe; they will not drop from the vine when ripe, as many grapes do, but will remain (unless gathered,) until they get perfectly dry, and their flavor is so very rich, that a few bunches, in a room, will perfume it for months. For making jelly they are not surpassed. H. E. SAGE."

"*Portland, April 8th, 1848.*—I this day received your line requesting information about the 'Sage Grape.' In answer to your inquiry, 'Is it a great and constant bearer?' I would say it is a constant bearer, and would be a prolific one, were it not for the rose bugs, which have almost wholly destroyed them for some years; it always blossoms *full*, and, just at this stage, the bugs appear to make their havoc.

"Seasons when not destroyed, the vine has been borne down with the fruit, probably as many as twenty bushels have been gathered from the vine which you saw; the bunches, in such seasons, are large and full; the berries very round, and their average girth three inches, and many of them much larger.

"The soil of my garden is rather of a dry, loamy nature, and brings forth vegetation pretty early. I have never used any kind of manure for my vine, and have scarcely taken the trouble to build a place for it to run upon.

"I would recommend rather a dry soil for its cultivation, and in a situa-

*Shurtleff's Seedling.*—The description of this grape is in the words of Dr. Shurtleff, who furnished the account, at my request, for this purpose. A gentleman who fruited this last year, represented it as being very good.

“It came up in my garden in Brookline, in 1837. The plant was of a delicate and slow growth; it fruited on the fourth year, and, on the fifth, it bore about four quarts of grapes of superior flavor; and the berry was of a good size, perfectly round, about the size of a Muscadine; the bunches of moderate bigness, and well set (*unlike the wild fox grape*); the stem pressed out like the Isabella; the color black, with a peculiar ray, like the spokes of a wheel, running from the stem to the eye of a lighter shade, the whole grape covered with a bloom; it puts out two or three weeks later than the Isabella, and ripens two or three weeks earlier. The vine is a small grower, and lives with me without protection; it is situated on a southeast angle of my house. The third year of bearing, it was, unfortunately, split near the ground, and the prospect of a good crop blasted. I have several young vines which will probably bear this year. The fruit is free from any foxy taste or pulp. I think it far superior to any native grape that I have seen. I do not know from what seed it originated, whether from native or imported; it

tion where the sun would strike it fair; the south side of a building would be preferable, and, if the soil is rich, I think it will do as well without manure as with it. I believe the dryer the soil, the sweeter will be the fruit.

“A vine which was cultivated from a plant from my garden, four years ago, bore profusely last season, and flourishes beyond calculation; it is placed on the south side of a house, and forms an arbor to the entrance of two tenements.

“In great haste, dear sir, I believe I have answered your inquiries.

“HENRY E. SAGE.”

appears to partake of the Sweetwater and Isabella in its rich flavor. S. A. SHURTLEFF."

The foliage of this grape would indicate that it originated from an American variety.

Dr. Shurtleff has another grape. It originated at Carver, on a farm belonging to this gentleman (and which has always been in the possession of his ancestors, since the settlement of the country). It was found in the woods, far from any other vine. The foliage indicates this to be a seedling from an American variety.

*Naumkeag*.—A seedling grape raised from the Isabella by Mr. Bowker, of Salem, which fruited, the first time, (in 1848,) appears to have good qualities. It bore a large crop, which ripened rather earlier than its parent; the bunches resemble it in form and flavor; it has a pulp also; the berries are above medium size, round, and of a clear red, with a slight bloom.

Mr. Amos W. Stetson, of East Braintree, Massachusetts, has several seedling vines of promise; they are hybrids. The female plant used, being a large native red grape of the forest, impregnated with the pollen of Black Hamburg, Sweetwater, Catawba and Isabella.

He numbers them one to six. Number four ripened its fruit early in September, fourteen days sooner than the Isabella; they are represented as being very hardy, great growers, and very prolific. The fruit resembles the Isabella, the bunch and berry being in shape and size like it. The fox flavor of the native is retained, probably in a greater degree than most people would like.

Another cross upon this, of the foreign kinds, would probably produce a hardy fruit, with less of this fox flavor,



and the seeds of it, without foreign impregnation, would, most likely, yield other varieties, as a fruit, when it has once sported from the original, is almost sure to continue, generation to generation, to do so.

*Early Amber*, is the name given to a native grape recently brought to notice by the Shakers at their nurseries, Harvard. The specimens of fruit sent me, closely resembled the Rose Chasselas, and were free of pulp and fox flavor. It is the best native fruit that I have yet met with. It is said to be hardy, not subject to mildew, and several weeks earlier than the Isabella. If, on extensive trial, all this prove true, we have an invaluable acquisition.

Wm. W. Valk, M.D., of Flushing, Long Island, New York, has succeeded in raising a grape of much promise, by hybridization. He fertilised the Black Hamburgh with the pollen of the Isabella, differing from the plan pursued by Mr. Stetson and myself. We used the Isabella and native wild grape as the female, and fertilised with the Black Hamburgh and other foreign kinds.

Dr. Valk says it is hardy, the fruit is thin skinned, with a soft and pleasant pulp, wholly unlike the Isabella, and equal to the Hamburgh in every thing but size. The foliage resembles the Hamburgh, though some think it distinct.

There are several other native American seedlings in this vicinity, which are recommended by persons who have eaten the fruit. As they have not been proved in garden cultivation, it is deemed best not to enumerate them.

## CONCLUSION.

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THE grape vine, in Italy, and in Spain, and the islands of the Mediterranean, as also in its native position, is found to be a plant attaining great age and size ; notwithstanding this, the cultivators of France have so changed its characteristics, that, in some districts there, by their skill, you may find it brought almost to the condition of an annual ; two or three years being the usual time at which they are renewed by layering, and being so close, that it is with difficulty you can pass among them.

With regard to soil, they present as striking a contrast ; they are successfully cultivated in vineyards, where there appears scarcely soil sufficient to retain moisture enough to keep life in the plant ; vineyards, enjoying equally good reputations, are situated where the soil is a rich loam.

Climate and exposition, as well as soil and manure, have a great bearing on this cultivation. What these

effects are, I trust, has been (in the language of others, and by notes of my own,) made sufficiently intelligible to be made of practical utility. If this has been accomplished, my object in preparing this Treatise has been attained. That the cultivation of the grape, in these United States, is to be vastly increased, there can be no question. How far European theories and modes of cultivation may be suitable here, is yet to be proved. That the grape is susceptible of an almost endless diversity of the modes of cultivation, has been fully established.

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